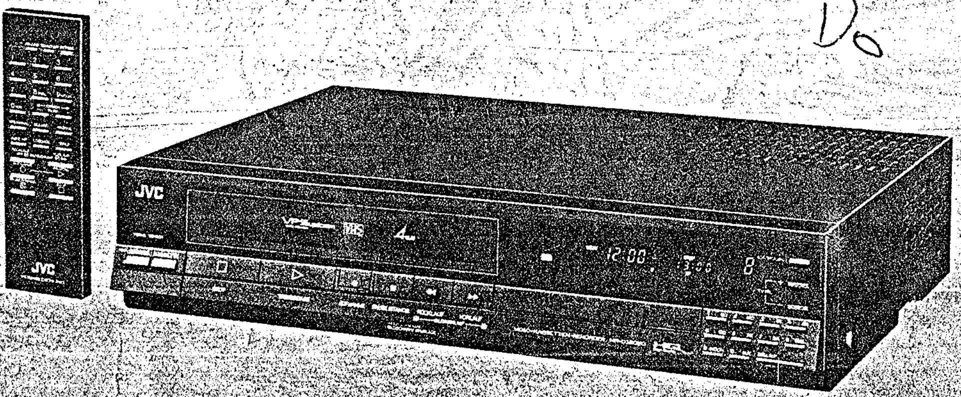
JVC

SERVICE MANUAL

COLOUR VIDEO CASSETTE RECORDER VHS

HR-D180E/EG/EK

Do



HQ
High Quality

The VPS UNIT (model VU-V90E) can be usen with models HR-D180E and HR-D180EG.

SPECIFICATIONS

Format : VHS PAL standard
Recording system : Rotary, slant azimuth two-head helical scan system with two pairs of video heads, one for the SP mode and the other for the LP mode
Video signal system : PAL colour and CCIR monochrome signals, 625 lines
Tape width : 12.65 mm
Playing time (SP) : 240 min. with E-240 video cassette
(LP) : 480 min. with E-240 video cassette
Temperature
Operating : 5°C to 40°C
Storage : –20°C to 60°C
Channel coverage : VHF 47 – 89 MHz, 104 – 300 MHz, 302 – 470 MHz
UHF 470 – 862 MHz
Aerial output : UHF channels 32 – 40 (adjustable)
Power consumption : 33 watts
Power requirement : 220 V∿, 50/60 Hz

Video
Input : 0.5 to 2.0 Vp-p, 75 ohms, unbalanced
Output : 1.0 Vp-p, 75 ohms, unbalanced
Signal-to-noise ratio : 43 dB (Rohde & Schwarz noise meter) with BILDSCHÄRFE control at centre position
Horizontal resolution : 250 lines with BILDSCHÄRFE control at centre position

Audio
Input : AUDIO connector (5-pin DIN): –20 dBs, more than 50 k-ohms, unbalanced
AUDIO/VIDEO socket (21-pin Peri connector): –3.8 dBs (CENELEC standard), more than 10 k-ohms, unbalanced
Output level : AUDIO connector (5-pin DIN): –6 dBs, high impedance load
AUDIO/VIDEO socket (21-pin Peri connector): –3.8 dBs (CENELEC standard), high impedance load
Output impedance : Less than 1 k-ohm, unbalanced
Signal-to-noise ratio : More than 40 dB
Frequency range : 70 Hz to 10,000 Hz
Timer : 1-Year/8-event timer
Dimensions : 435 mm(W) x 95 mm(H) x 341 mm(D)
Weight : 7.0 kg
Provided accessories : Aerial cable,
Video cassette tape,
Infrared remote control unit,
"R03" battery x 2,
VPS unit

Specifications shown are for SP mode unless otherwise specified.
Design and specifications subject to change without notice.

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No. 8457
June 1986

NOTE: For a technical description, please refer to Technical Guide T-8049 HR-D180 PAL.

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NOTE: For a technical description, please refer to Technical Guide T-8049 HR-D180 PAL.

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UNIT BOARD ASSEMBLY [A1] VU-4

Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▨) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

4. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistors

5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

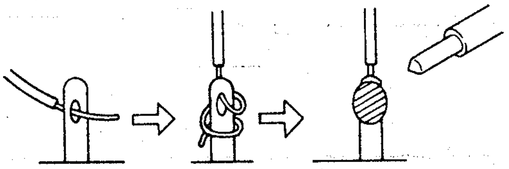


Fig. 1

6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

7. Check that replaced wires do not contact sharp edged or pointed parts.

8. When a power cord has been replaced, check that 10—15 kg of force in any direction will not loosen it.

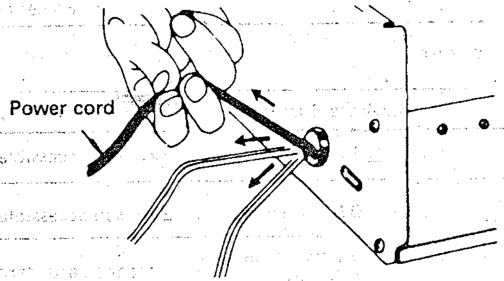


Fig. 2

9. Also check areas surrounding repaired locations.

10. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

11. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.
    1) **Connector part number :** E03830-001
    2) **Required tool :** Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

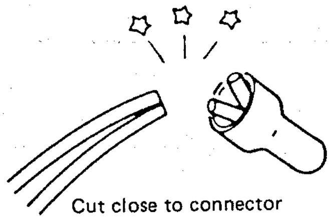


Fig. 3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

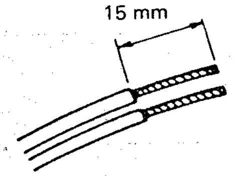


Fig. 4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

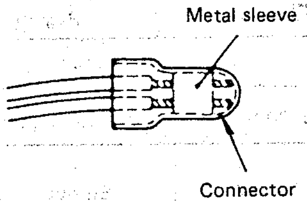


Fig. 5

(4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

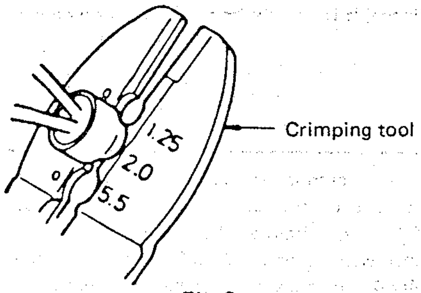


Fig. 6

(5) Check the four points noted in Fig. 7.

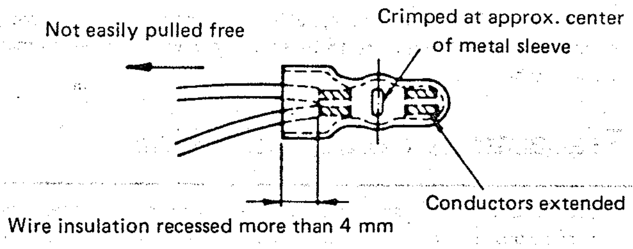

Not easily pulled free
Crimped at approx. center of metal sleeve
Conductors extended
Wire insulation recessed more than 4 mm

Fig. 7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. **Insulation resistance test**
   Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.
2. **Dielectric strength test**
   Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.
3. **Clearance distance**
   When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table below.

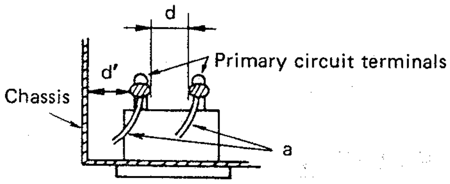


Fig. 8

4. **Leakage current test**
   Confirm specified or lower leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

Measuring Method: (Power ON)
Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure and following table.

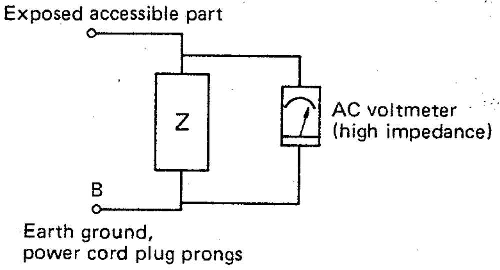


Fig. 9

AC Line Voltage	Region	Insulation Resistance	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	≧ 1 mΩ/500 V DC	1 kV 1 minute	≧ 3 mm
110 to 130 V	USA & Canada	—	900 V 1 minute	≧ 3.2 mm
*110 to 130 V 200 to 240 V	Europe Australia	≧ 10 mΩ/500 V DC	4 kV 1 minute	≧ 6 mm (d) ≧ 8 mm (d') (a: Power cord)

*Class II model only.

Table 1 Ratings for selected areas

AC Line Voltage	Region	Load Z	Leakage Current (i)	Earth Ground (b) to:
100 V	Japan	1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 µF 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe Australia	2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

Table 2 Leakage current ratings for selected areas

Note: This table is unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

SECTION 1
MECHANISM ADJUSTMENT

1.1 GENERAL

1.1.1 Precautions

IMPORTANT:

1. Disconnect unit from power before removing or soldering components.
2. When removing a fastener (screw, washer, etc.), be careful not to drop it into the mechanism. If a fastener should be dropped, be sure to retrieve it.
3. The tape transport mechanism has been precisely adjusted at the factory and ordinarily does not require readjustment.
4. When removing a part, be very careful not to damage or displace other parts. (Be especially careful with the tape guides and rotary video head drum.)
5. For service procedures that call for operation of the set with the cassette housing is separated from the main-deck, perform as below.

1) Disable the photo transistor sensor (END SENSOR) on the main-deck by applying an opaque cover.
2) Supply power and select required mades with front panel operation buttons.

1.1.2 Required test equipment, fixtures and tools

For proper mechanical adjustment, the following test equipment, fixtures and tools are strongly recommended. Without them, a long trial-and-error period would be necessary, resulting in possible damage. In addition, general-purpose tools are required.

1. Test equipment required:

Color television or monitor
Oscilloscope: Wide-band, dual trace, triggered, delayed sweep
Recording tape
Alignment tapes

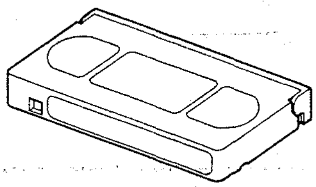
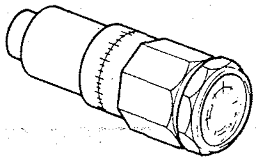
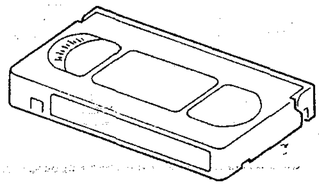
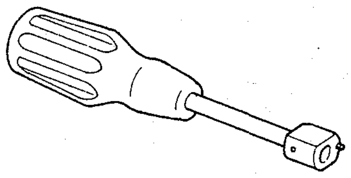
JVC alignment tape MH-2 	Torque gauge assembly PUJ48075-2 (Torquemeter : 600ATG Torquemeterhead : PUJ48016-2) 	Back tension cassette gauge PUJ48076 
A/CTL head position tool PUJ47351-2 		

Table 1-1-1 Fixtures and tools

1.1.3 Disassembly

1. Top cover
1) Take out four screws located on right and left sides.
2) Shift the top cover a little to the rear direction, then remove it upwards.

2. Front panel
1) Remove the top cover.
2) Bend three portions (A) of the front panel upwards to disengage them from the chassis.
3) Then pull the front panel outwards.
4) Disengage three portions (B) of the front panel from the chassis, then remove the front panel.

3. Bottom cover
1) Remove the top cover.
2) Loosen the screws of the four feet, then pull out the feet from the chassis.
3) Take out four screws, then remove the bottom cover.

4. Cassette housing door
1) Pull the center of the cassette housing door to bend it out, then remove the cassette housing door. Use care regarding the torsion spring on the left.

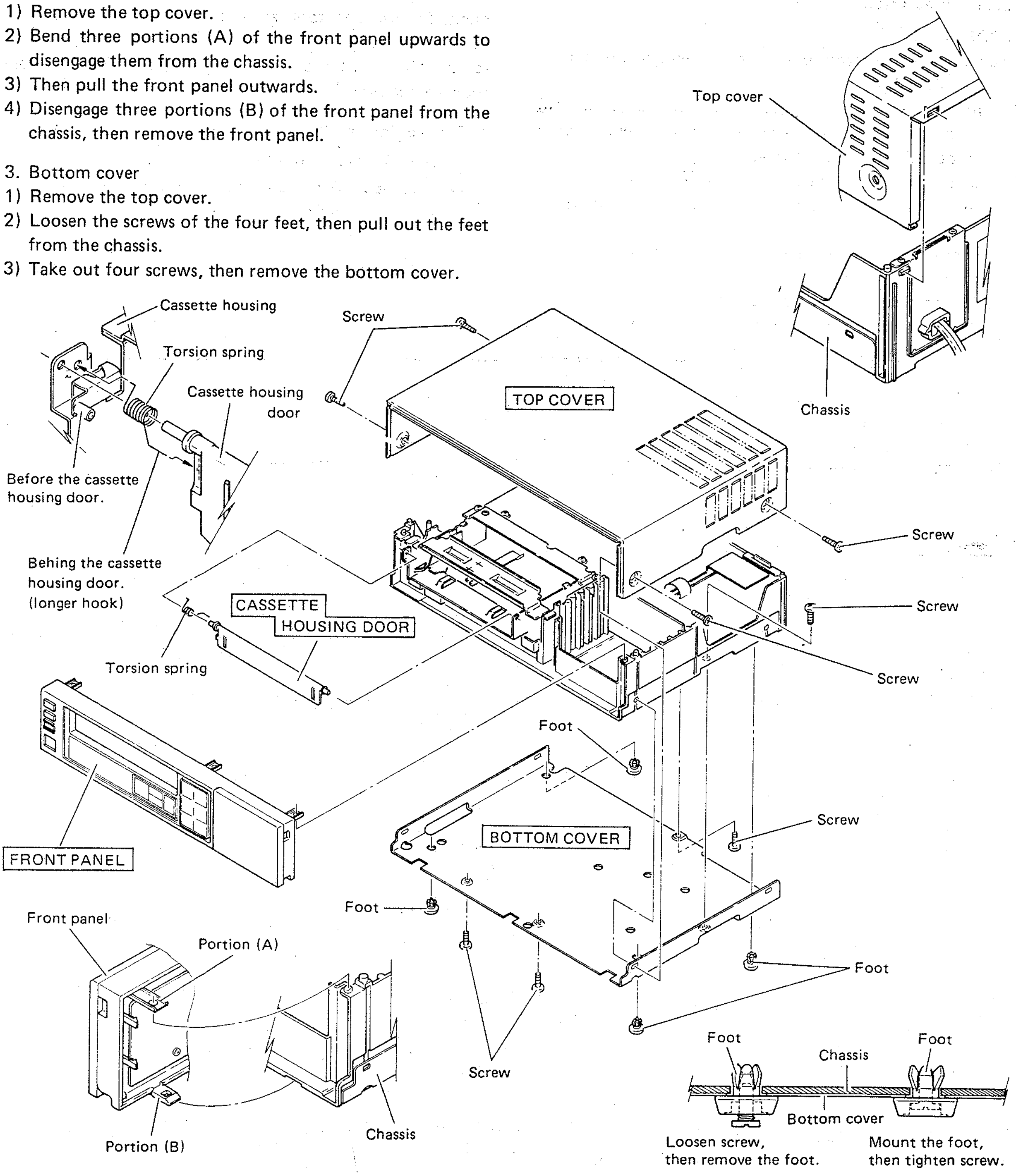

Top cover
Chassis
Cassette housing
Screw
Torsion spring
Cassette housing door
TOP COVER
Before the cassette housing door.
Screw
Behing the cassette housing door. (longer hook)
CASSETTE HOUSING DOOR
Screw
Torsion spring
Screw
Foot
FRONT PANEL
BOTTOM COVER
Screw
Foot
Front panel
Portion (A)
Foot
Foot
Chassis
Foot
Screw
Bottom cover
Chassis
Portion (B)
Loosen screw, then remove the foot.
Mount the foot, then tighten screw.

Fig. 1-1-1 Removal of external covers

1.1.4 Layout of main parts

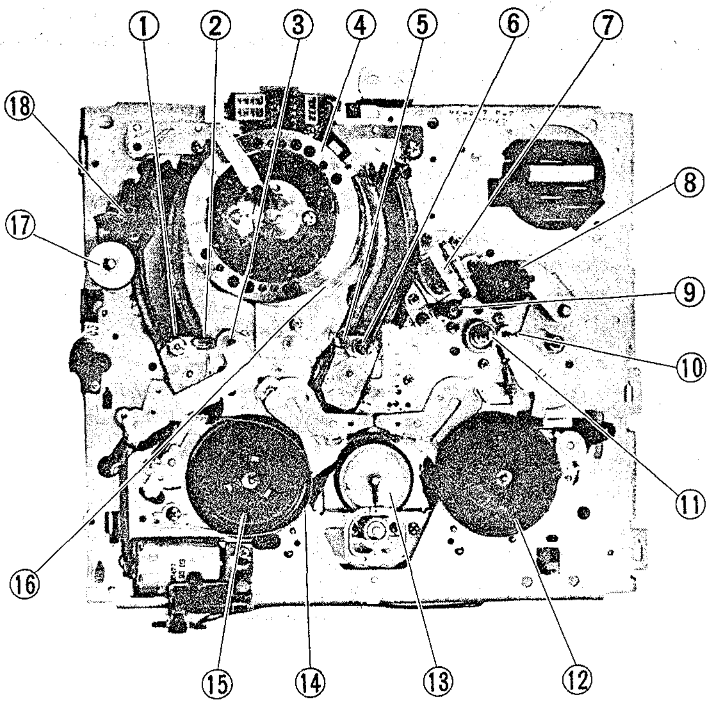


Fig. 1-1-2 Top view of main-deck

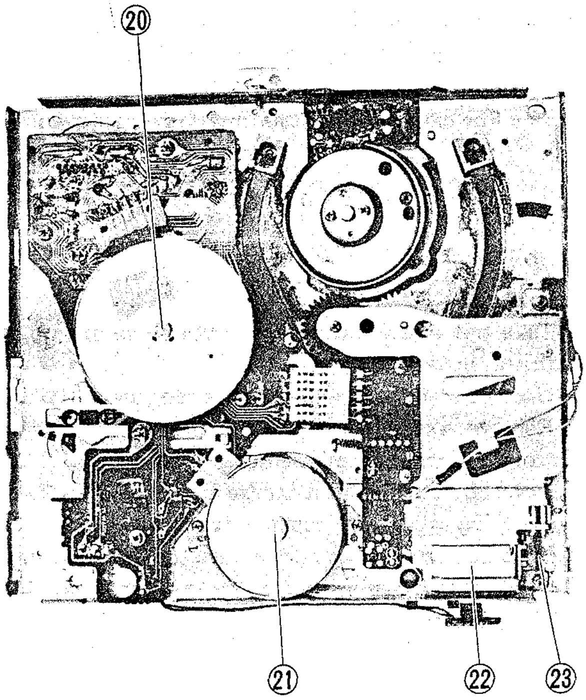


Fig. 1-1-3 Bottom view of main-deck

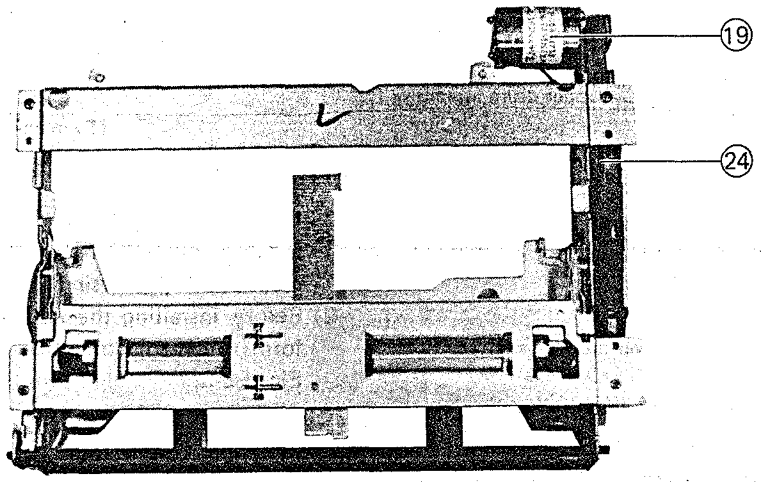


Fig. 1-1-4 Cassette housing

1. Supply guide roller
2. Supply slant pole
3. Tension pole
4. Upper drum
5. Take-up slant pole
6. Take-up guide roller
7. A/C head
8. Pinch roller
9. Take-up guide pole
10. Guide arm
11. Capstan
12. Take-up reel disk
13. Reel idler
14. Tension band
15. Supply reel disk
16. Lower drum
17. Impedance roller
18. Full erase head
19. Cassette motor
20. Capstan motor
21. Reel motor
22. Mode motor
23. Mode belt
24. Cassette belt

1.2 MAIN ASSEMBLY REPLACEMENT

1.2.1 Upper drum assembly

Notes: When handling and installing the upper drum assembly, avoid directly touching the head tips on the upper drum assembly.
For cleaning the head tips, push and hold a lint-free cloth or chamois dampened with alcohol to the upper drum assembly by the fingers, then turn the upper drum assembly clockwise. Do not clean the upper drum assembly with a vertical stroke.

1. Removal
1) Take out a screw and remove the brush assembly from the drum assembly.
2) Unsolder all soldered portions on the DRUM PWB. Remove excess solder, then remove the DRUM PWB from the upper drum assembly.
Note: Soldered portion can be easily removed by removing solder with sucker or wick.
3) Take out two screws and remove the upper drum assembly upwards.

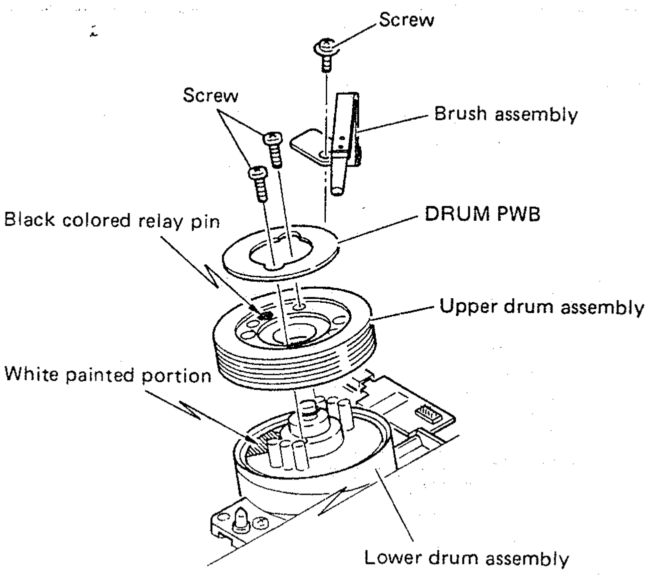


Fig. 1-2-1 Upper drum assembly

2. Installation
1) Install a new upper drum assembly so that the black-colored relay pin of the upper drum assembly overlies the white painted portion of the lower drum assembly, as shown in Fig. 1-2-1.
2) Tighten two screws in a balanced manner.
3) Set the DRUM PWB on the upper drum assembly, then resolder it.
4) Clean the drum unit (particularly clean the upper drum assembly).
5) Mount the brush assembly on the original position, then tighten a screw to fix the brush assembly.

3. Confirmation and adjustment
1) Perform the FM envelope confirmation. Refer to section 1.6.1.
2) Perform the PB switching point adjustment of the Servo circuit. Refer to section 2.3.1.

1.2.2 A/C head (Audio/control head)

1. Removal
1) Disconnect connectors from the A/C HEAD PWB.
2) Take out two screws, then remove the A/C head and the head base together.
3) Unsolder and separate the A/C HEAD PWB from the A/C head.
4) Take out a screw and remove the shield cap from the A/C head.
5) Take out three screws and separate the A/C head from the head base. Use care regarding springs. Do not lose them.

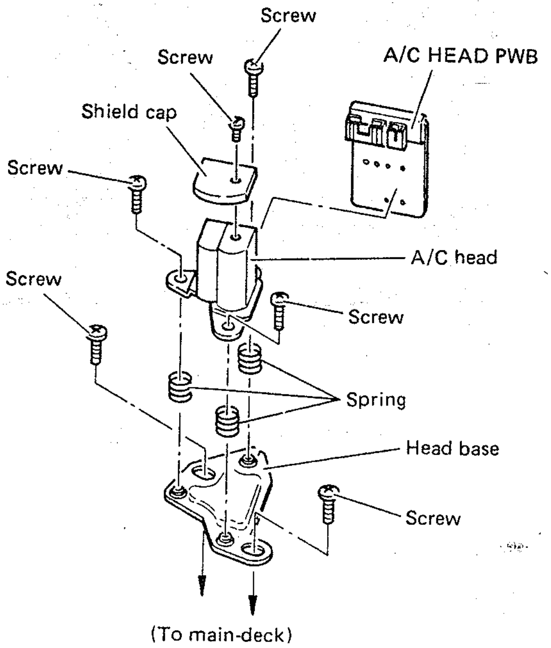


Fig. 1-2-2 A/C head

2. Installation
1) Mount a new A/C head and other peripheral parts on the main-deck by reversing the removal procedure.
2) Before installing the A/C head on the main-deck, perform rough-adjustment of A/C head height as shown in Fig. 1-2-3.

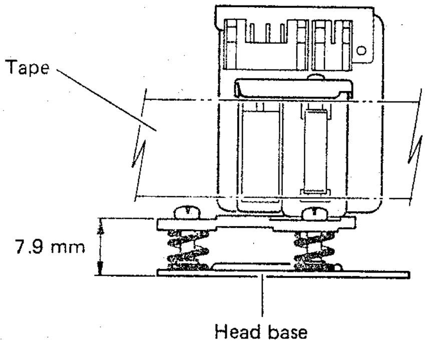


Fig. 1-2-3 A/C head height

3. Confirmation and adjustment
1) Use a recording tape and confirm correct tape transport operation, then perform interchangeability adjustment. Refer to sections 1.5 and 1.6.

1.2.3 Tension band assembly

1. Removal

1) Take out a screw, then pry the A portion of the tension band assembly upwards to separate it from the tension arm assembly.

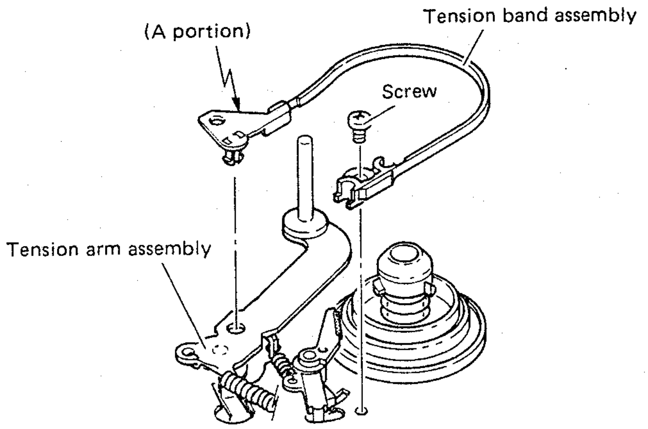

(A portion)
Tension band assembly
Screw
Tension arm assembly

Fig. 1-2-4 Tension band assembly

2. Installation

1) Install a new tension band assembly by reversing the removal procedure.

3. Confirmation and adjustment

1) Perform tension pole position adjustment. Refer to section 1.4.1.

1.3 ASSEMBLY PROCEDURE OF MECHANISM

The mechanism of this model is mostly engaged to the mechanism control circuit, through the mode select switch. Therefore, the relation between the mode select switch and the control arm decides all mechanical movement of the mechanical parts such as levers, gears, rollers and so on. If these parts are not properly positioned, the unit will be unloaded or compulsorily stopped. This will result in damage of mechanical or electrical parts.

1.3.1 Loading arm assembly

Loading arm assembly consists of loading gear, torsion spring and loading arm.

1. Set up the loading arm assembly correctly as shown in Fig. 1-3-1.

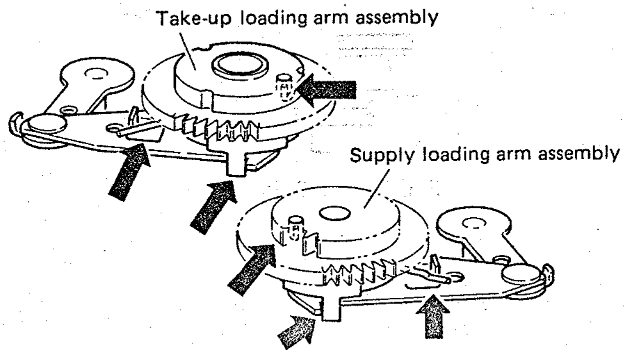

Take-up loading arm assembly
Supply loading arm assembly

Fig. 1-3-1 Loading arm assembly (1)

2. Install the take-up loading arm assembly and the supply loading arm assembly so that the holes on the loading gears face each other, as shown in Fig. 1-3-2. Do not move the loading arm assemblies from this position for the next step.

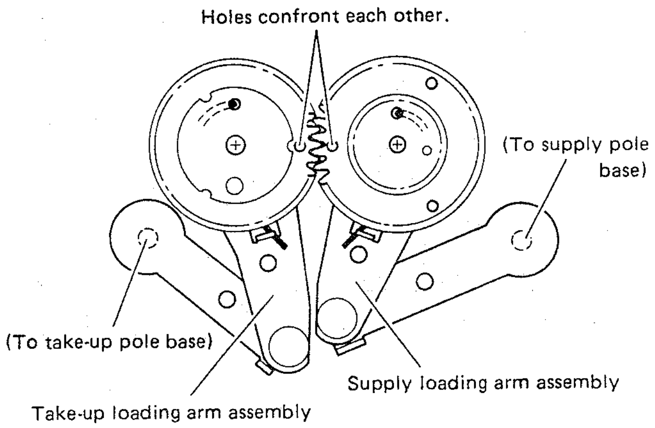

Holes confront each other.
(To supply pole base)
(To take-up pole base)
Supply loading arm assembly
Take-up loading arm assembly

Fig. 1-3-2 Loading arm assembly (2)

1.3.2 Control cam

1. Set the arm gear assembly on the cam bracket assembly so that the hole of the arm gear assembly overlaps the hole of the cam bracket assembly.

2. Install the control cam on the cam bracket assembly so that the hole of the control cam overlaps the hole which is indicated in the step 1), as shown in Fig. 1-3-3. Do not turn the control cam from this position for the next step.

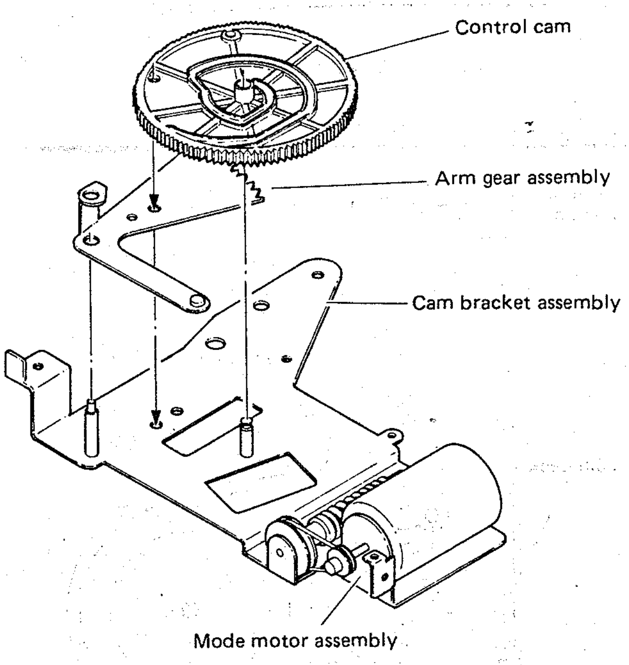

Control cam
Arm gear assembly
Cam bracket assembly
Mode motor assembly

Fig. 1-3-3 Control cam

1.3.3 Cam bracket assembly

1. Push and hold the plate assembly so that the hole of the plate assembly overlaps the hole of the main-deck, as shown in Fig. 1-3-4.
2. Then mount the cam bracket assembly.

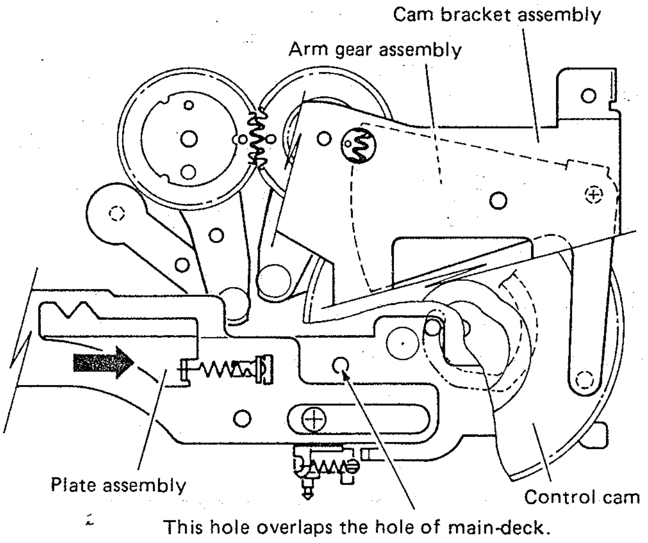

Cam bracket assembly
Arm gear assembly
Plate assembly
Control cam
This hole overlaps the hole of main-deck.

Fig. 1-3-4 Cam bracket assembly

1.4 CONFIRMATION AND ADJUSTMENT

1.4.1 Tension pole position adjustment

1. Without loading a tape, set for the Play mode.
2. Loosen screw a little bit, then adjust the tension band holder so that the distance, shown in Fig. 1-4-1, becomes zero (0 mm).
3. Tighten screw to fix the tension band holder.

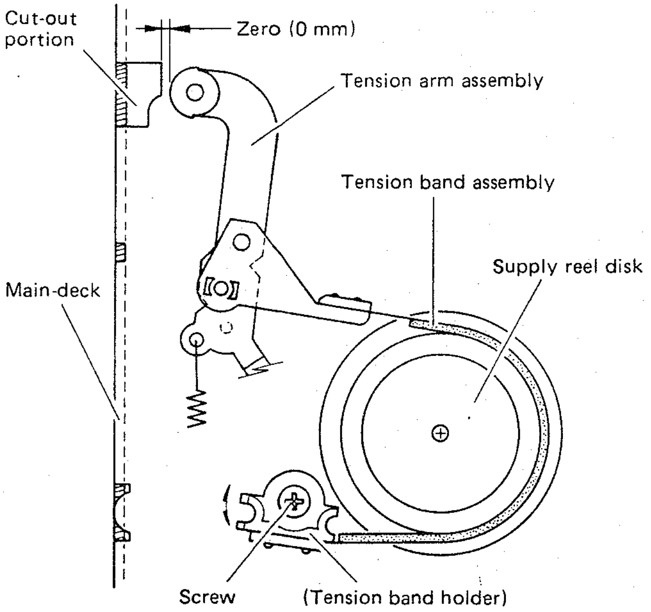

Cut-out portion
Zero (0 mm)
Tension arm assembly
Tension band assembly
Supply reel disk
Main-deck
Screw
(Tension band holder)

Fig. 1-4-1 Tension pole position

Note: By this adjustment, back tension is within normal specification, in spite of parts tolerances.

4. Use the back tension cassette gauge and set for the Play mode.
5. Confirm that the indication is between 24—40.

1.4.2 Take-up torque confirmation

1. Set the Play mode without the cassette housing assembly.
2. Set the torque gauge on the take-up reel disk.
3. The torque gauge consists of upper and lower sections connected by a spring mechanism. Relax the grip on the torque gauge so that the indicator needle and scale rotate at equal speed, then read the indication. The correct value is between 50 – 150.
4. If necessary, replace the take-up and supply clutches.

1.5 TAPE TRANSPORT SYSTEM CONFIRMATION AND ADJUSTMENT

Once adjusted to the complete condition, readjustment of the tape transport system is not necessary, except when the parts that compose the tape transport system are replaced due to troubles by long usage or unexpected accidents.

1.5.1 Tape transport system adjustment

1. Guide roller

   To get the FM envelope into ideal shape for interchangeability, the height adjustment of the guide roller is needed.

   Before turning the guide roller, slightly loosen the setscrew located under the guide roller. For loosening the setscrew, use the hex key (1.25 mm).

   Note: Loosen the setscrew enough to allow the guide roller to be turned. If excessively loose, tape motion may turn the guide roller inadvertently.

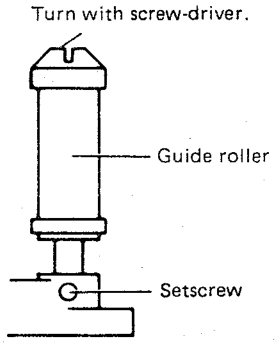

Turn with screw-driver.
Guide roller
Setscrew

Fig. 1-5-1 Guide roller

2. Impedance roller
Normally, do not adjust the height of the impedance roller. Only when the defects of tape travel are noted at the impedance roller, after complete adjustment for interchangeability, adjust the height of impedance roller to obtain smooth tape travel. For adjustment of impedance roller height, use the nut-driver (5.5 mm).
Note: Do not lower the impedance roller excessively to avoid the defects of tape travel. Tape must be along the lower flange located under the impedance roller.

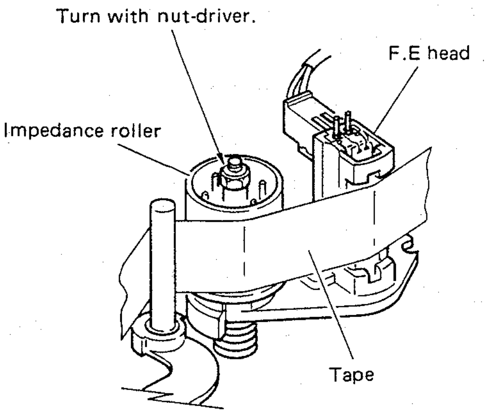

Turn with nut-driver.
F.E head
Impedance roller
Tape

Fig. 1-5-2 Impedance roller

3. A/C head (audio/control head)
When defects of tape travel are noted at the take-up guide pole, adjust the inclination of A/C head to obtain smooth tape travel.

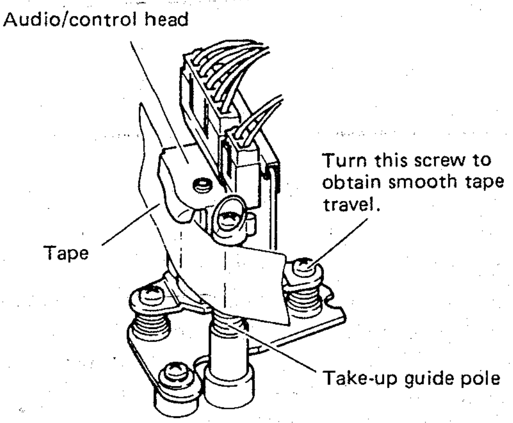

Audio/control head
Turn this screw to obtain smooth tape travel.
Tape
Take-up guide pole

Fig. 1-5-3 A/C head

1.6 INTERCHANGEABILITY CONFIRMATION AND ADJUSTMENT

Before using an alignment tape, use a recording tape and confirm correct tape transport operation.
For the FM envelope output, connect an oscilloscope to TP106 of the MAIN PWB. For audio output, connect to the AUDIO OUT terminal, and trigger the oscilloscope externally with the signal from TP110 of the MAIN PWB. Use only the stairstep segment of the alignment tape MH-2, do not another segment for interchangeability.

1.6.1 FM envelope confirmation and adjustment

1. Turn the TRACKING knob to obtain the maximum FM envelope output corresponding to (a) level in Fig. 1-6-1. Ovserve the FM envelope, read the maximum level (a) and the minimum levels (b), (c) and (d).
Confirm that:

$$\frac{b}{a} \geq 0.7,\ \frac{c}{a} \geq 0.5 \text{ and } \frac{d}{a} \geq 0.5$$

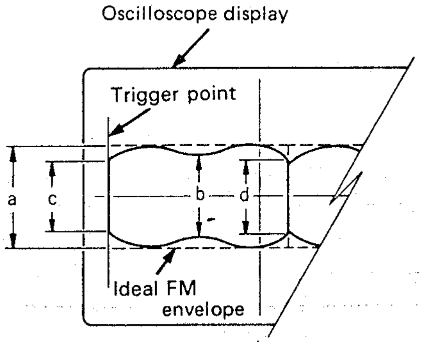

Oscilloscope display
Trigger point
a
c
b
d
Ideal FM envelope

Fig. 1-6-1 FM envelope

2. If defects are noted, following adjustments are required.
1) Observe the oscilloscope display and turn the TRACKING knob to vary the FM output from maximum to minimum.
2) If the variation is not parallel at the rising portion (drum entrance) of the FM envelope, turn the supply guide roller so that the rising portion of the envelope becomes nearly flat, as shown in Fig. 1-6-2.

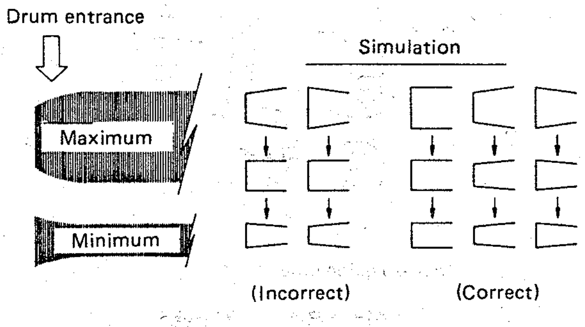

Drum entrance
Simulation
Maximum
Minimum
(Incorrect)
(Correct)

Fig. 1-6-2 Drum entrance

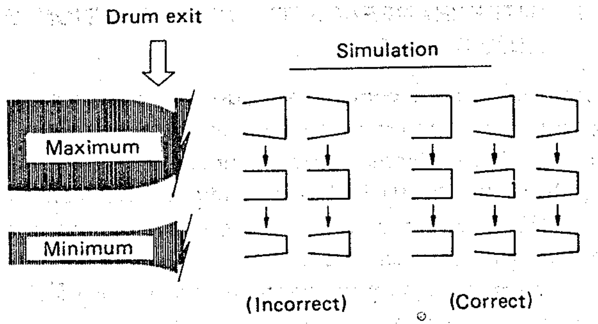


Fig. 1-6-3 Drum exit

3) In the same manner as for the rising portion, turn the take-up guide roller to adjust the falling portion (drum exit) of the FM envelope. See Fig. 1-6-3.
4) In addition to observing the envelope, confirm absence of tape curling or wrinkling at the impedance roller and take-up guide pole. If it occurs at the impedance roller, adjust the impedance roller height. If it occurs at the take-up guide pole, adjust the A/C head inclination.
5) Vary the FM envelope output level and perform fine adjustments of the guide rollers.

1.6.2 A/C head height and azimuth adjustments

Incorrect A/C head height can impair audio signal-to-noise ratio when playing back a pre-recorded tape.

1. For A/C head inclination, adjust screw (A) so that small tape wrinkles are not produced at the take-up guide pole. Turn screw (A) clockwise so that the tape wrinkles are apparent with the lower flange of the take-up guide pole, then turn screw (A) counter-clockwise so that the wrinkles smooth out.
2. Adjust azimuth with screw (B).
   Turn screw (B) to obtain maximum audio output.
3. For A/C head height, turn screws (A), (B) and (C) in succession by small and equal increments at a time and adjust for maximum audio output level.

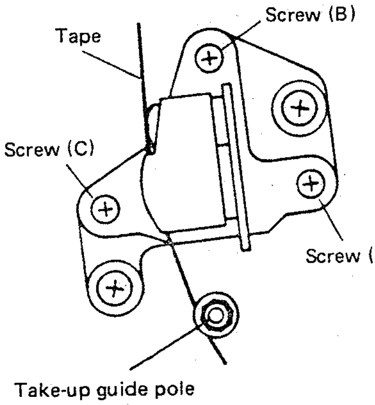


Fig. 1-6-4 A/C head

1.6.3 Control head phase adjustment

1. Set the TRACKING knob to AUTO (center detent position).
2. Loosen screws (D) and (E) a little bit, then cover screw (D) with the A/CTL head position tool and set the pin of the tool into the hole next to screw (D).
3. Turn the tool counter-clockwise to shift the A/C head fully in the direction of the capstan, and then gradually turn the tool clockwise and observe the FM envelope output.
4. Set the A/C head at the point of the first output peak.

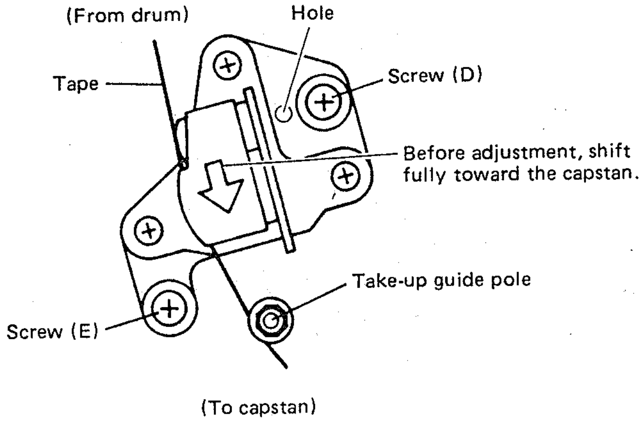


Fig. 1-6-5 Control head phase

1.6.4 Setscrew tightening

1. After confirming absence of tape wrinkling and other transport irregularities, tighten the setscrews located under the guide rollers while in the Stop mode.
   Note: Since the guide rollers are easily moved, use care when tightening.
2. Again perform the FM envelope confirmation.

1.6.5 Final confirmation

1. Supply a video signal and perform recording, then play back.
   Confirm that the FM envelope satisfies the specifications during playback of alignment tape MH-2.
2. Perform the PB switching point adjustment of the Servo circuit. Refer to section 2.3.1.
3. Perform the audio PB level adjustment of the Audio circuit. Refer to section 2.5.2.
4. Perform overall confirmation of the Video circuit. Refer to section 2.4.

SECTION 2
ELECTRICAL ADJUSTMENTS

2.1 PREPARATION

Electrical adjustments are required after replacing circuit components and certain mechanical parts.
It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

2.1.1 Required test equipment

1. Color television or monitor
2. Oscilloscope: wide-band, dual-trace, triggered delayed sweep
3. Frequency counter
4. Audio oscillator
5. Audio voltmeter
6. Digital voltmeter
7. Signal generator: RF/IF sweep/marker
8. Signal generator: PAL colour bar, stairstep
9. Recording tape
10. Alignment tapes: (MH-2)

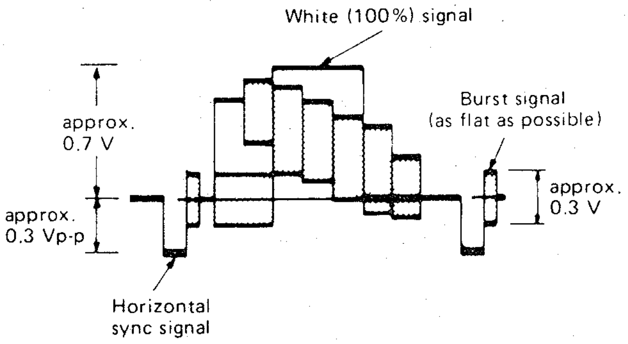

White (100%) signal
Burst signal
(as flat as possible)
approx.
0.7 V
approx.
0.3 Vp-p
approx.
0.3 V
Horizontal
sync signal

Fig. 2-1-1 Colour bar signal of pattern generator

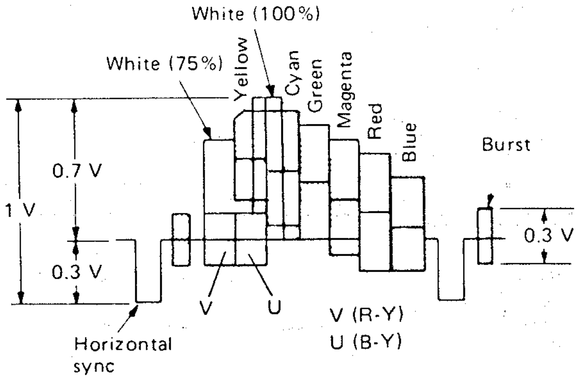
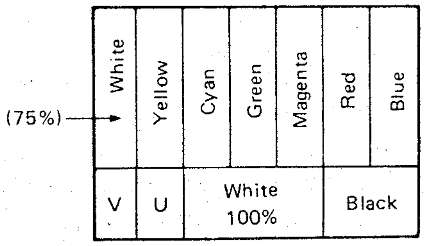

White (100%)
White (75%)
Yellow
Cyan
Green
Magenta
Red
Blue
Burst
1 V
0.7 V
0.3 V
0.3 V
V
U
V (R-Y)
U (B-Y)
Horizontal
sync

Fig. 2-1-2 Colour bar signal waveform



White	Yellow	Cyan	Green	Magenta	Red	Blue
V	U	White 100%			Black	

Fig. 2-1-3 Colour bar pattern

2.1.2 Check and adjustment steps

The check and adjustment steps are provided in the following in the form of charts. For clarity, the nomenclature used in the charts is outlined below.

No.	Checks and adjustments are numbered in the recommended sequence in which they are to be performed.
Item	Name assigned to the particular check and adjustment step.
Check Point	Location to which measuring instrument (oscilloscope unless otherwise noted) is to be connected.
Adjustment Parts	Variable component (resistor, capacitor, etc.) to be adjusted in this step. Dash (—) indicates check only.
Signal & Mode	• Input signal required to perform adjustment. Dash (—) indicates that special signal is not required. • Equipment operating mode at time of check or adjustment.
Colour bar	Colour bar signal as video input
Stairstep	Stairstep signal as video input
1 kHz	Supply a 1 kHz sinewave as audio input signal.
MH-2 Colour bar	Play colour bar segment of MH-2 alignment tape.
MH-2 Stairstep	Play stairstep segment of MH-2 alignment tape.
MH-2 1 kHz	Play 1 kHz audio signal segment of MH-2 alignment tape.
MH-2 RF sweep	Play RF sweep segment of MH-2 alignment tape.
Stop	Power on and machine in Stop mode.
REC	Recording mode
PB	Playback mode
REC ↓ (another mode)	Use blank tape, record, then play back in the mode specified.
Search	Search (FWDS and REVS) playback mode
Slow	Slow motion playback mode
Still	Playback then Pause
A DUB	Audio dubbing mode
Description and Waveform	This column provides an explanation of the step, notes, adjustment values and waveform diagrams.

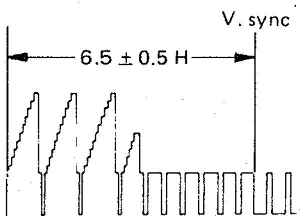
2.2 TIMER CIRCUIT (15 TIMER board)

Note: Unless otherwise specified, test points and variable rasistors are located on the TIMER board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Timer Clock	TP2	C102	• E-E	1) Connect the frequency counter to TP2 and GND. 2) Short TP1 (TEST) and GND. Then short the plus (+) terminal of C7 and GND once in order to reset. 3) Adjust period T with C102 so that: T = 0.999995 ± 0.000001 sec.

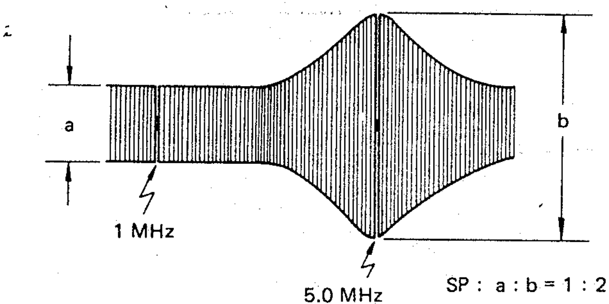
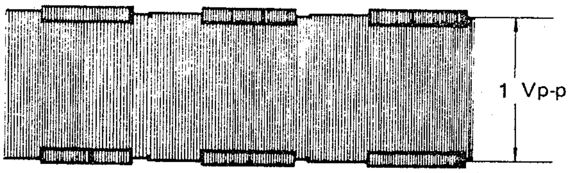
2.3 SERVO CIRCUIT (08 SERVO board)

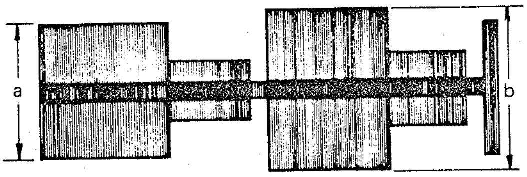
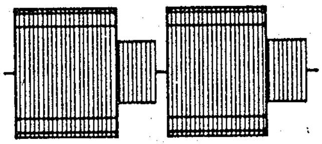
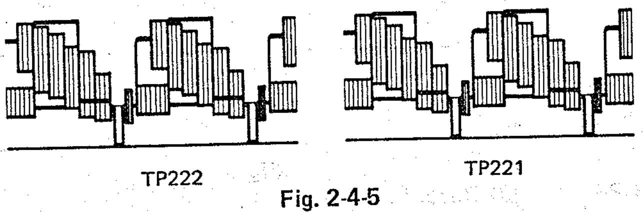
Notes: Unless otherwise specified, test points and variable resistors are located on the SERVO board.
Before steps 1 and 2 adjustments "Control head phase adjustment" must be completed. (Refer to Sec. 1.6.3)

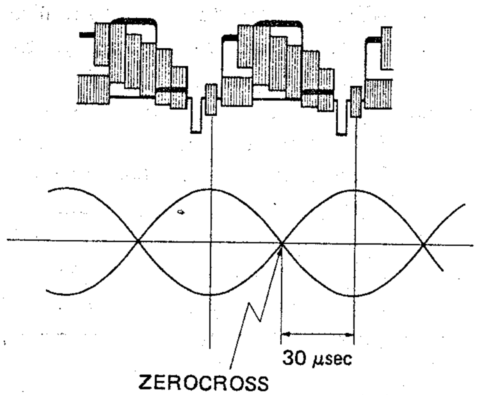
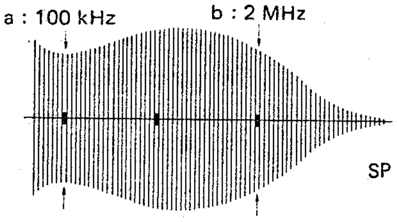
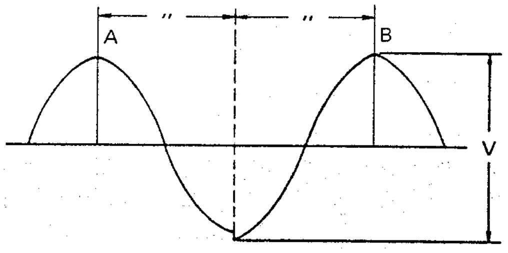
1	PB Switching Point  Fig. 2-3-1	VIDEO OUT or CN2, pin 12 (03 VIDEO board)	R35 (CH-1) PB SW POINT	• PB • MH-2 Stairstep • Trigger slope (–) • SP mode	1) Connect an oscilloscope to VIDEO OUT or CN2 pin 12 of the VIDEO board. 2) Play back the stairstep segment of MH-2 alignment tape. 3) Trigger the oscilloscope externally (– slope) with the signal from TP11 (DRUM FF). 4) Adjust R35 to position the trigger point 6.5 ± 0.5H from V. sync.
2	CTL Head Position	VIDEO OUT or CN2, pin 12 (03 VIDEO board)	R46 CTL Head Position	• PB • Colour bar	1) Connect an oscilloscope to VIDEO OUT or CN2 pin 12 of the VIDEO board. 2) Play back the colour bar segment of MH-2 alignment tape. 3) Adjust R46 for maximum output level.
3	V. Pulse Position	MONITOR	R1 (06 TERMINAL board)	• Still • REC then PB • Colour bar • SP mode	1) Record the color bar signal, then playback. 2) In the Still mode, observe the monitor and adjust R1 for the minimum vertical jitter.

2.4 VIDEO CIRCUIT (0 3 MAIN board)

Note: Unless otherwise specified, test points and variable resistors are located on the Main board.

<table>
<tr><th>No.</th><th>Item</th><th>Check Point</th><th>Adjustment Parts</th><th>Signal & Mode</th><th>Description</th></tr>
<tr><td rowspan="2">1</td><td>Video Head Resonance & Quality Factor (4 3 PRE/ REC Amp board)</td><td>TP2 (CH1 SP REC FM)
TP5 (PB FM)
TP1 (CH2 SP REC FM)
TP3 (CH1 LP REC FM)
TP4 (CH2 LP REC FM)</td><td>C7 (SP CH1 fo)
R2 (SP CH1 Q)
C5 (SP CH2 fo)
R1 (SP CH2 fo)
C13 (LP CH1 fo)
R3 (LP CH1 Q)
C15 (LP CH2 fo)
R4 (LP CH2 Q)</td><td>• RF Sweep
• PB
• SP mode
• RF Sweep
• PB
• LP mode</td><td rowspan="2">1) Set for the playback mode without a tape. (Refer to mechanical adjustment 1.1.1.)
2) Connect a sweep generator to TP2 (CH1) and TP1 (CH2).
3) At TP5, adjust C7 (CH1) and C5 (CH2) for 5.0 MHz peaking, and R2 (CH1) and R1 (CH2) so that the ratio between 1 MHz and 5 MHz level becomes 1 : 2 as shown in Fig. 2-4-1.
4) Perform adjustment in the same manner as SP mode CH1, CH2. Connect a sweep generator to TP3 (CH1) and TP4 (CH2).
5) At TP5, adjust C13 (CH1) and C15 (CH2) for 5.0 MHz peaking, and R3 (CH1) and R4 (CH2) so that the ratio between 1 MHz and 5 MHz level becomes 1 : 2 as shown in Fig. 2-4-1.</td></tr>
<tr><td colspan="4">
SP : a : b = 1 : 2
LP : a : b = 1 : 2
Fig. 2-4-1</td></tr>
<tr><td>2</td><td>VXO</td><td>TP306
FSC</td><td>R328
VXO</td><td>• PB
• MH-2 colour bar
• SP mode</td><td>1) Connect a frequency counter to TP306.
2) Play back the colour bar segment of MH-2 alignment tape.
3) Adjust R328 for 4.433619 MHz ± 50 Hz.</td></tr>
<tr><td rowspan="2">3</td><td>REC FM level</td><td>TP2 (CH1 SP REC FM) (4 3 PRE/REC Amp board)</td><td>R119 (REC FM ADJ)</td><td>• Colour bar
• REC
• LP mode
• Colour bar
• REC
• SP mode</td><td rowspan="2">1) Supply a color bar input signal.
2) Connect an oscilloscope to TP2 on PRE/REC Amp board.
3) In the LP mode, adjust R119 so that the pedestal level of the vertical blanking component becomes 1 Vp-p.
4) In the SP mode, confirm that the pedestal leve of the vertical blanking component becomes 1.3 Vp-p.</td></tr>
<tr><td colspan="4">
Fig. 2-4-2
1 Vp-p : LP mode
1.3 Vp-p : SP mode</td></tr>
</table>

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
4	SP REC Colour Level	TP304  Fig. 2-4-3	R322	•PB •SP mode •REC then PB •Colour bar •SP mode	1) Connect an oscilloscope to TP304 playback a colour bar segment of the MH-2 and observe colour signal level. 2) Adjust the Tracking control (R401) of the OPERATION board for maximum level of the colour waveform and make a note of the higher colour level. 3) Set the Tracking contorl (R401) of the OPERATION board to the center click position. 4) Record the colour bar signal, then playback. Before recording, adjust R322 so that the higher level channel becomes 95 to 105% of the noted level during playback. At this time, confirm that the channel difference is within 3 dB.
5	LP REC Colour Level	TP304	R438	• PB • LP mode • REC then PB • Colour bar • LP mode	1) Connect an oscilloscope to TP304 playback a colour bar segment of the MH-2 and observe colour signal level. 2) Adjust the Tracking control (R401) of the OPERATION board for maximum level of the colour waveform and make a note of the higher colour level. 3) Set the Tracking contorl (R401) of the OPERATION board to the center click position. 4) Record the colour bar signal, then playback. Before recording, adjust R438 so that the higher level channel becomes 75 to 85% of the noted level during playback. At this time, confirm that the channel difference is within 3 dB.
6	Inverted Colour Level	TP405 (PB COLOUR 4.43 MHz)  Fig. 2-4-4	R401 (INVERTED COLOUR LEVEL)	• MH-2 Colour bar • PB	1) Connect an oscilloscope to TP405 and observe signal level. 2) Connect jump wires between TP434, TP435 and GND. Again check the TP405 level. 3) Adjust R401 to obtain the same level in both cases as shown in Fig. 2-4-4
7	0.5 H Delayed Video Level	TP222 (ORIGINAL VIDEO IN) TP221 (0.5 H DELAYED VIDEO)  Fig. 2-4-5	R223 (0.5 H DELAYED VIDEO LEVEL)	• MH-2 Colour bar • PB • LP mode	**Note:** Perform the 0.5 H Delayed Video Level adjustment after completing Inverted Colour Level. 1) Connect one channel of a dual trace oscilloscope to TP222 and the other channel to TP221. 2) Adjust R223 to obtain the same level in both cases as shown in Fig. 2-4-5.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
8	APC Error Phase	TP405 (PB Colour) TP433 (7.8 kHz)	L401 (7.8 kHz TUNING)	• MH-2 Colour bar	1) Connect one channel of a dual trace oscilloscope to TP405 and the other channel to TP433 and observe the waveforms. 2) Adjust L401 to position the zero-cross 30 µsec ± 3 µsec from the center of the burst signal as shown in Fig. 2-4-6.
	 Fig. 2-4-6				
9	0.5 H Delayed Jump DET	TP432 (VCO OUTPUT)	R418 (0.5 H DELAYED Jump DET)	• No. Signal (AUX) • E-E	1) Connect a jump wires between TP431 and TP SWD 5 V. 2) Connect a frequency counter to TP432. 3) Adjust R418 to obtain 30 ± 0.2 kHz.
10	SP PB Frequency response	TP110 (VIDEO OUT)	R110 (SP RF EQ)	• Video Sweep • REC then PB • SP mode	1) Connect an oscilloscope to TP110. 2) Set the Sharpness control (R402) of OPERATION board to center click position. 3) Record and playback a video sweep (with sync) signal. 4) Adjust R110 so that the 2 MHz level become 0 ± 1 dB (79 – 96%) with reference to 100 kHz.
	 SP : $\frac{b}{a} = 0 \pm 1$ dB LP : $\frac{b}{a} = -4 \pm 1$ dB Fig. 2-4-7				
11	LP PB Frequency response	TP110 (VIDEO OUT)	R202 (LP RF EQ)	• Video Sweep • REC then PB • LP mode	1) Connect an oscilloscope to TP110. 2) Set the sharpness control to center click position. 3) Record and playback a video sweep (with sync) signal. 4) Adjust R202 so that the 2 MHz level become –4 ± 1 dB with reference to 100 kHz as shown in Fig. 2-4-7.
12	SECAM DET (*E/EG Model)	TP310 (S DET ADJ)	L351 (1/2 fH TUNING) R355 SECAM DET. ADJ	• SECAM Colour bar • E-E	1) Connect an oscilloscope to TP310. 2) Adjust L351 so that transistion step becomes centered between "A" and "B" as shown in Fig. 2-4-8.  Fig. 2-4-8
	Set this point to center position between points "A" and "B". V = more than 5.5 Vp-p in REC V = 6.5 ± 0.5 Vp-p in PB			• REC → PB	3) Record then playback. 4) Adjust R355 for 6.0 ± 0.5 Vp-p.

2.5 AUDIO & CUE CIRCUIT (0 9 AUDIO & CUE board)

Note: Unless otherwise specified, test point and variable resistors are located on the AUDIO & CUE board.

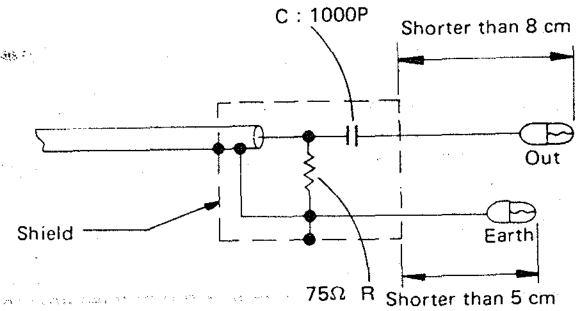
No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Audio Bias Level	TP31 BIAS LEVEL	R20 BIAS LEVEL	• REC • SP mode	1) Connect a digital voltmeter between TP31 and 32. 2) Set for the REC mode without signal. 3) Adjust R20 for 12.5 V ± 0.2 mVrms.
2	Audio PB Level	AUDIO OUT	R5 PB LEVEL	• REC • SP ro EP mode	1) Connect an oscilloscope to AUDIO OUT. 2) Supply an audio signal (−8 dBs/1 kHz) to AUDIO IN and record together with a VIDEO signal, then play back. 3) Adjust R5 so that the audio output level during playback becomes −6 ± 2 dBs.

2.6 TUNER/IF CIRCUIT (0 7 TU/IF board)

Note: Unless otherwise specified, test points and variable resistors are located on the TUNER/IF board.

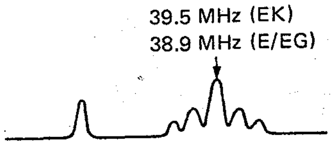
Equipment required

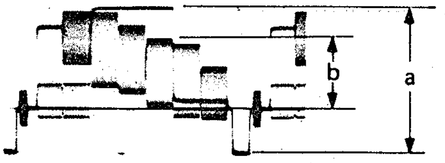
1. Oscilloscope
2. IF sweep signal generator with suitable markers (PIF, SIF, etc.)
3. DC power supplies – For power bias (12.0 V)
   – For IF AGC bias (approx. 5 V variable)
4. Sweeper probe (sweep signal supply cable) as shown below.



Sweeper probe

Fig. 2-6-1

1	VCO E/EG : 38.9 EK : 39.5	IC1 pin 28	T2  VCO and sweep signal Fig. 2-6-2	• Sweep • Generator	1) Use the probe shown in the figure (for IF adjustment) and connect IF sweep signal to the SAW 1 input terminal. 2) Apply DC 4.5 V to pin 6 of IC1 (IF AGC). Connect oscilloscope to pin 28 (VIDEO DET OUT) and adjust T2 to align the waveform with the frequency marker indicated at left. **Note:** Sweep generator output level is 70 dB μ/75 Ω.
2	Front End IF E/EG : 38.15 EK : 39.5	U/V Tuner (Inside the tuner unit)	IF Coil	• Sweep • Generator	1) Use the IF adjustment probe to connect the IF sweep signal to the front end (U/V TUNER) test point (TP). 2) Use the IF adjustment probe to connect the SAW 1 input terminal with the IF detector. 3) Adjust the IF core of the front end for maximum frequency.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
3	FTZ Trap E/EG only	U/V Tuner (Inside the tuner Unit)	T1	• Colour Bar	1) Supply a 32.4 MHz with 400 Hz AM modulation signal to the U/V tuner TP. 2) Connect oscilloscope to pin 28 of IC1 and adjust the output side core of T1 for minimum level.
4	RF AGC E/EG/EK	U/V Tuner (Inside the tuner Unit)	R11	• Colour Bar	1) Receive a colour bar signal and connect oscilloscope to the front end IF terminal. 2) Adjust R11 for maximum level. Then again turn R11 to reduce the level by 10 dB.
5	VPS Y Level E/EG only	CN3-pin 1 (VPS OUT)	R16	• Modulated signal	1) Receive an 87.5% modulated signal. Adjust R16 to obtain a maximum Y level (including sync) of 2.0 Vp-p from pin 1 (VPS OUT) of CN3.
6	Colour Level E/EG/EK	CN2-pin 3 (VIDEO OUT)	R42	• Colour Bar	1) Receive a colour bar signal. With Y level taken as 100%, adjust R42 for a magenta level of 48% at pin 3 (VIDEO OUT) of CN2.
	 b : magenta a : b = 1 : 0.48 Fig. 2-6-3				

ABSCHNITT 3
ELEKTRISCHE EINSTELLUNGEN FÜR HR-D180EG

3. 1 VORBEREITUNGEN

Elektrische Einstellungen sind erforderlich, wenn Bauteile oder in einigen Fällen auch mechanische Teile ausgetaucht werden.
Abgleich und Einstellarbeiten sollten erst begonnen werden, wenn der Austauch von Teilen oder deren Reparatur beendet ist. Abgleicharbeiten sollten unterbleiben, falls die dafür erforderlichen Meßeinrichtungen nicht verfügbar sind.

3. 1. 1 Erforderliche Meßgeräte

1. Farbmonitor
2. Oszilloskop: Zweikanal-Oszilloskop mit verzögerter Zeitbasis
3. Frequenzzähler
4. NF-Generator
5. NF-Voltmeter
6. Digital-Voltmeter
7. Signalgenerator: HF/ZF Wobbler mit Markengenerator
8. Signalgenerator: PAL-Farbbalken, Grautreppe
9. Videocassette für Aufnahmen
10. Abgleichband MH-2

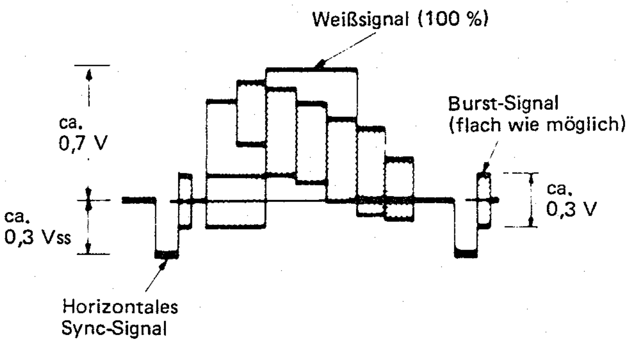

Weißsignal (100 %)
Burst-Signal
(flach wie möglich)
ca.
0,7 V
ca.
0,3 Vss
ca.
0,3 V
Horizontales
Sync-Signal

Abb. 3-1-1 Farbbalken des Signalgenerators

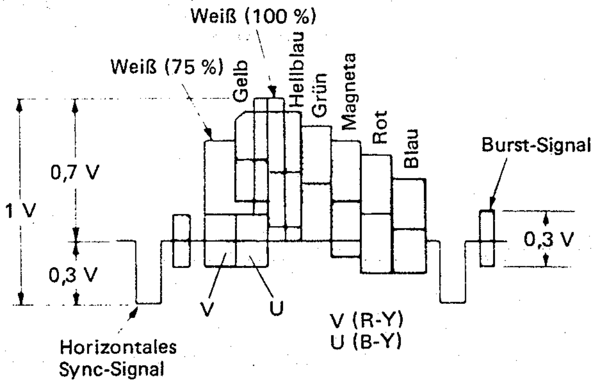

Weiß (100 %)
Weiß (75 %)
Gelb
Hellblau
Grün
Magneta
Rot
Blau
Burst-Signal
0,7 V
1 V
0,3 V
0,3 V
V
U
V (R-Y)
U (B-Y)
Horizontales
Sync-Signal

Abb. 3-1-2 Farbbalkensignalform

(75%) →	Weiß	Galb	Hellblau	Grün	Magenta	Rot	Blau
	V	U	Weiß 100%			Schwarz	

Abb. 3-1-3 Farbbalkenaufteilung

3.1.2 Prüf- und Abgleichschritte

Die erforderlichen Prüf- und Abgleichschritte sind in Form von Tafeln zusammengefaßt. Im folgenden werden die verwendeten Angaben erläutert.

Nr.	Prüf- und Abgleicharbeiten werden in empfohlener Ausführungsreihenfolge angegeben.
Position	Bezeichnung des spezifischen Prüf- oder Abgleichschrittes.
Testpunkt	Anschlußpunkt für zu verwendende Meßinstrumente (Oszilloskop, falls nicht anders angegeben).
Abgleichpunkt	Regelbares Teil (Widerstand, Kondensator), das bei diesem Schritt justiert werden muß. Ein Strichsymbol zeigt an, daß nur eine Überprüfung erforderlich ist.
Signal & Betriebsart	• Das erforderliche Eingangssignal. Ein Strichsymbol zeigt an, daß kein Signal erforderlich ist. • Für Prüf- und Abgleicharbeit erforderliche Betriebsart.
Farbbalken	Farbbalkensignal als Videoeingang
Grautreppe	Grautreppensignal als Videoeingang
MH-2 1 kHz	Als Audio-Eingangssignal einen 1-kHz-Sinuston anlegen.
MH-2 Fabbalken	Abschnitt Farbbalken von Abgleichcassette MH-2 abspielen.
MH-2 Grautreppe	Abschnitt Grautreppe von Abgleichcassette MH-2 abspielen.
MH-2 Wobbelsignal	Abschnitt Wobbelsignal von Abgleichcassette MH-2 abspielen.
Stop	Gerät einschalten, Stopbetriebsart
Aufnahme	Aufnahmebetriebsart
Wiedergabe	Wiedergabebetriebsart
Aufnahme ↓ (Andere Betriebsart)	Ein Band neu bespielen und in der angegebenen Betreibsart wiedergeben.
Suchlauf	Bildsuchlauf vorwärts/rückwärts
Zeitlupe	Zeitlupewiedergabe
Standbild	Wiedergabepause
Nachv.	Nachvertonungsbetriebsart
Beschreibung	Diese Spalte enthält Angaben zu Bedienschritten, Einstellwerten, Wellenformen sowie Hinweise.

3.2 ABBREVIATIONS USED IN THE SCHEMATIC DIAGRAM

A	AC	: Alternating Current
	ACC	: Automatic Color Control
	A/CTL	: Audio/Control
	ADC	: Analog to Digital Converter
	ADD	: Adder
	ADJ	: Adjustment
	A DUB	: Audio Dubbing
	AE	: Audio Erase
	AEF	: Automatic Editing Function
	AFC	: Automatic Frequency Control
	AFT	: Automatic Fine Tuning
	AGC	: Automatic Gain Control
	AH	: Audio Head
	AHD	: Audio High Density Disk
	AL	: After Loading
	ALC	: Automatic Light Compensation Automatic Level Control
	ALM	: Alarm
	ALU	: Arithmetic Logic Unit
	AM	: Amplitude Modulation
	AMP	: Amplifier
	ANT	: Antenna
	APC	: Automatic Pedestal Control Automatic Phase Control
	APL	: Average Picture Level
	A/S/M	: Audio/Servo/Mechacon
	ASS'Y	: Assembly
	ATT	: Attenuator
	AUD	: Audio
	AUTO	: Automatic
	AUX	: Auxiliary
B	B	: Base
	BAL	: Balance
	BATT	: Battery
	BBD	: Bucket Brigade Device
	BCD	: Binary Coded Decimal
	BEG	: Beginning
	BFP	: Burst Flag Pulse
	BIT	: Binary Digit
	BLK	: Black, Blanking
	BLU	: Blue
	BNC	: Bayonet Connector
	BOT	: Beginning of Tape
	BPF	: Bandpass Filter
	BRK	: Brake
	BRN	: Brown
	BRT	: Brightness
	BT	: Band Tuning
	BUFF	: Buffer
	BW or B/W	: Black and White
C	C	: Capacitance, Collector, Color
	CAL	: Calibration
	CAP	: Capstan, Capacitor
	CAR	: Carrier
	CARR	: Carrier
	CASS	: Cassette
	CC	: Cassette Compartment
	CCD	: Charge Coupled Device
	CCT	: Circuit
	CdS	: Cadmium Sulphide
	CD	: Count Down
	CE	: Chip Enable
	CF	: Ceramic Filter, Color Frame
	CH	: Channel
	CHG	: Charge
	CHROMA	: Chrominance
	CLK	: Clock
	CLR	: Clear
	CMD	: Command
	CMOS	: Complementary Metal Oxide Semiconductor
	CNT	: Count, Counter
	COL	: Color
	COM	: Common
	COMB	: Combination Comb Filter
	COMP	: Comparator Composite Compensation
	CONN	: Connector
	CONV	: Converter
	CP	: Circuit Protector Clamp Pulse
	CPC	: Capstan Phase Control
	CPU	: Central Processing Unit
	CTC	: Crosstalk Cancel
	CTL	: Control
D	D	: Drum, Digital, Diode, Drain
	DAC	: Digital to Analog Converter
	dB	: Decibel
	DC	: Direct Current
	DD	: Direct Drive
	DEC	: Decoder
	DEMOD	: Demodulator
	DEMUX	: Demultiplexer
	DET	: Detector
	DEV	: Deviation
	DFRS	: Drum Free Running Stop
	DG	: Differential Gain
	DIF	: Differential
	DISCR	: Discriminator
	DL	: Delay Line
	DOC	: Dropout Compensator
	DOD	: Drop Out Detector
	DP	: Differential Phase
	DPC	: Drum Phase Control
	DYAC	: Dynamic Aperture Control
E	E	: Edit, Emitter
	EDP	: Electronic Data Processing
	E-E	: Electric to Electric
	EF	: Emitter-Follower
	EMP	: Emphasis
	EN	: Enable
	ENC	: Encoder
	ENV	: Envelope
	EOT	: End of Tape
	EP	: Extended Play
	EQ	: Equalizer
	ES	: Electronic Switch
	ESNS	: End Sensor
	EXP	: Expander
	EXT	: External
F	F	: Farad, Fuse
	F ADV	: Frame Advance
	FDP	: Fluorescent Display Panel
	FE	: Full Erase
	FET	: Field Effect Transistor
	FF	: Fast Forward Flipflop
	FG	: Frequency Generator
	FM	: Frequency Modulation
	FMA	: FM Audio
	FR	: Full Recording, Frame, Fusible Resistor
	FREQ	: Frequency
	F-V CONV	: Frequency to Voltage Converter
	FWD	: Forward
	FWD S	: Forward Search
G	G	: Green, Gate, Grid
	GEN	: Generator
	GND	: Ground
	GRN	: Green
	GRY	: Gray
H	H	: High, Henry, Hour
	HBF	: Horizontal Burst Flag
	HD	: Horizontal Drive
	HG	: Hall Generator
	HPF	: Highpass Filter
	Hz	: Herz

I
IC : Integrated Circuit
ID : Identification (Pulse)
IF : Intermediate Frequency
IFR : Infrared
IFT : Intermediate Frequency Transformer
IND : Indicator
INH : Inhibit
INS : Insert
INT : Internal, Interrupt
INV : Inverter
I/O : Input/Output
IR : Infrared

L
L : Low, Left
LCD : Liquid Crystal Display
LED : Light Emitting Diode
LIM : Limiter
LIN : Linearity
LOAD : Loading (Cassette)
LP : Long Play
LPF : Lowpass Filter
LSB : Lower Sideband

M
M : Motor, Mega
MAX : Maximum
MDA : Motor Drive Amplifier
MECHACON : Mechanism Control
MIC : Microphone
MIN : Minimum
MIX : Mixer, Mixing
MMV : Monostable Multivibrator
MNOS : Metal Nitride Oxide Semiconductor
MOD : Modulation, Modulator
MODEM : Modulator-Demodulator
MON : Monitor
MOS : Metal Oxide Semiconductor
MPX : Multiplexer, Multiplex
MS : Mode Select
MUT : Muting

N
NAND : Not-And
NC : Not Connected, Normally Closed
NFB : Negative Feedback
NLN : Non-Linear
NO : Normally Open
NOR : Normal, Not-Or
NR : Noise Reduction

O
OP : Operation
OPAMP : Operational Amplifier
ORN : Orange
OSC : Oscillator

P
PB : Playback
PC : Photocoupler, Pulse Counter
PCM : Pulse Code Modulation
PG : Pulse Generator
PGM : Program
PI : Photo Interrupter
PIF : Picture Intermediate Frequency
PLA : Programmable Logic Array
PLL : Phase Locked Loop
POS : Position
p-p : Peak-to-Peak
PR : Pinch Roller
PREAMP : Preamplifier
PRL : Preroll
P/S : Pause/Still
PSC : Pulse Swallowing Control
PU : Pickup
PUT : Programmable Unijunction Transistor
PWB : Printed Wiring Board
PWM : Pulse Width Modulation
PWR : Power

Q
Q : Quality Factor

R
R : Red, Right
RA : Resistor Array
RAM : Random Access Memory
REC : Recording
REF : Reference
REG : Regulated, Regulator
REM : Remote
REMOCON : Remote Control (Unit)
REV : Reverse
REV S : Reverse Search
REW : Rewind
RF : Radio Frequency
ROM : Read Only Memory
R/P : Record/Playback
RPT : Repeat
RS FF : RS Flipflop
RST : Reset
RT : Rotary Transformer
RUN : Running
RY : Relay

S
SAW : Sawtooth, Surface Acoustic Wave
SC : Subcarrier, Simulcast
SCH : Search
SEL : Select, Selector
SENS : Sensor
SEP : Separator
SF : Source Follower
SFF : Short Fast Forward
SIF : Sound Intermediate Frequency
SN : Signal to Noise Ratio
SOL : Solenoid
SOS : Sound on Sound
SP : Standard Play
SR : Supply Reel
SREV : Search Reverse
SREW : Short Rewind
S/S : Slow/Still
SSG : Sync Signal Generator
SSNS : Start Sensor
STD : Strobe Data, Standard
SUP : Supply
SW : Switch
SWD : Switched
SYNC : Synchronization
SYSCON : System Control

T
TAL : Tally
TBC : Time Base Corrector
TC : Tension Control, Time Code
TEN : Tension
TF : Thermal Fuse
TIM : Timing
TK : Tracking
TNR : Tuner
TP : Test Point
TPZD : Trapezoid
TR : Transistor, Trimmer
TRANS : Transformer
T/T : Tuner/Timer
TU : Take-up

U
UL : Unloading
UNREG : Unregulated
UNSW : Unswitched

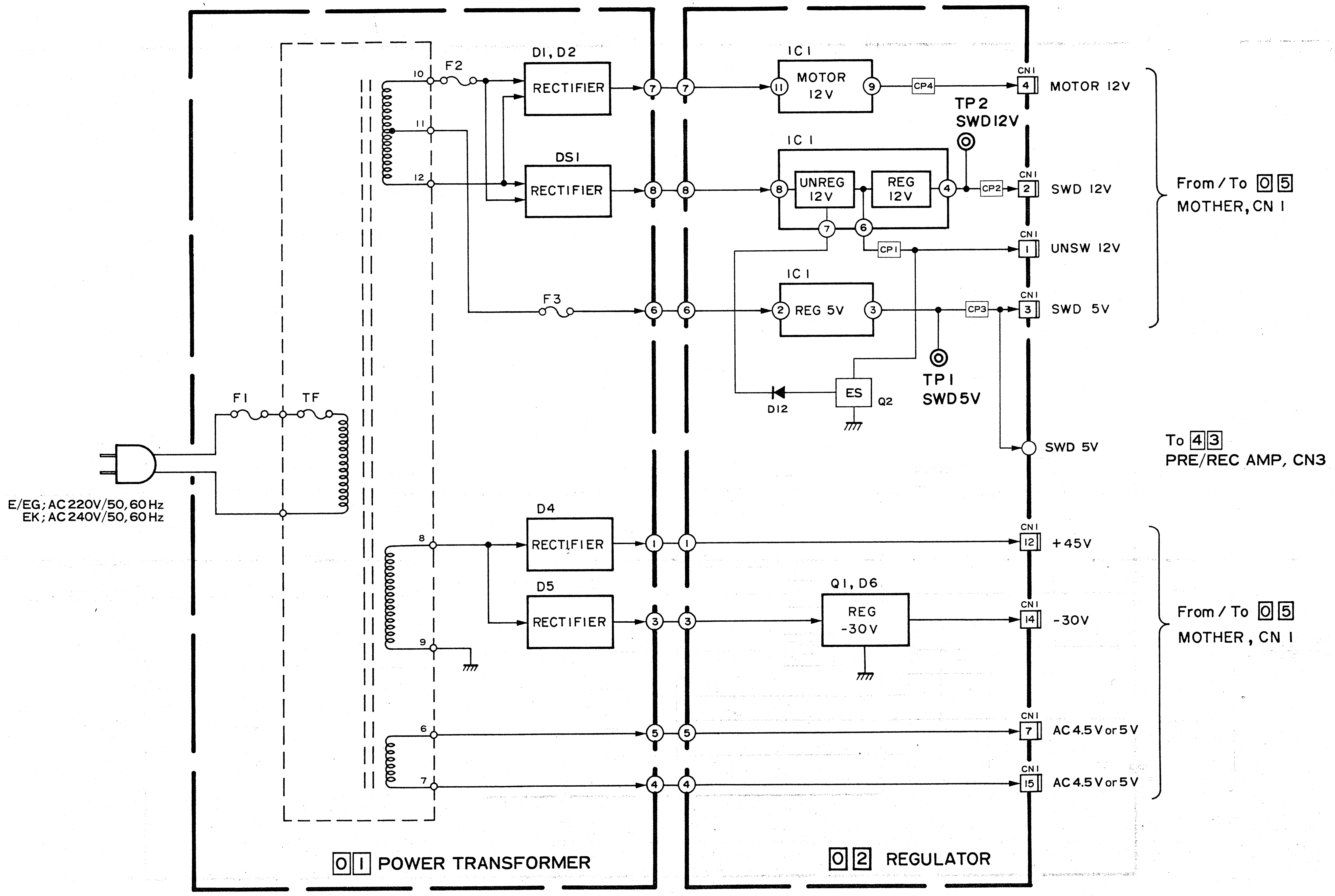
V
V : Vertical, Volt
VACT : Video Action
VCO : Voltage Controlled Oscillator
VD : Vertical Drive
VIF : Video Intermediate Frequency
VLT : Violet
VR : Variable Resistor
VS : Video and Sync
VSCH : Variable Search
V/T : Video/Television
V/U : VHF/UHF
VXO : Variable Crystal Oscillator

W
W : Watt
WARN : Warning
W & D : White and Dark
WHT : White
WV : Working Voltage

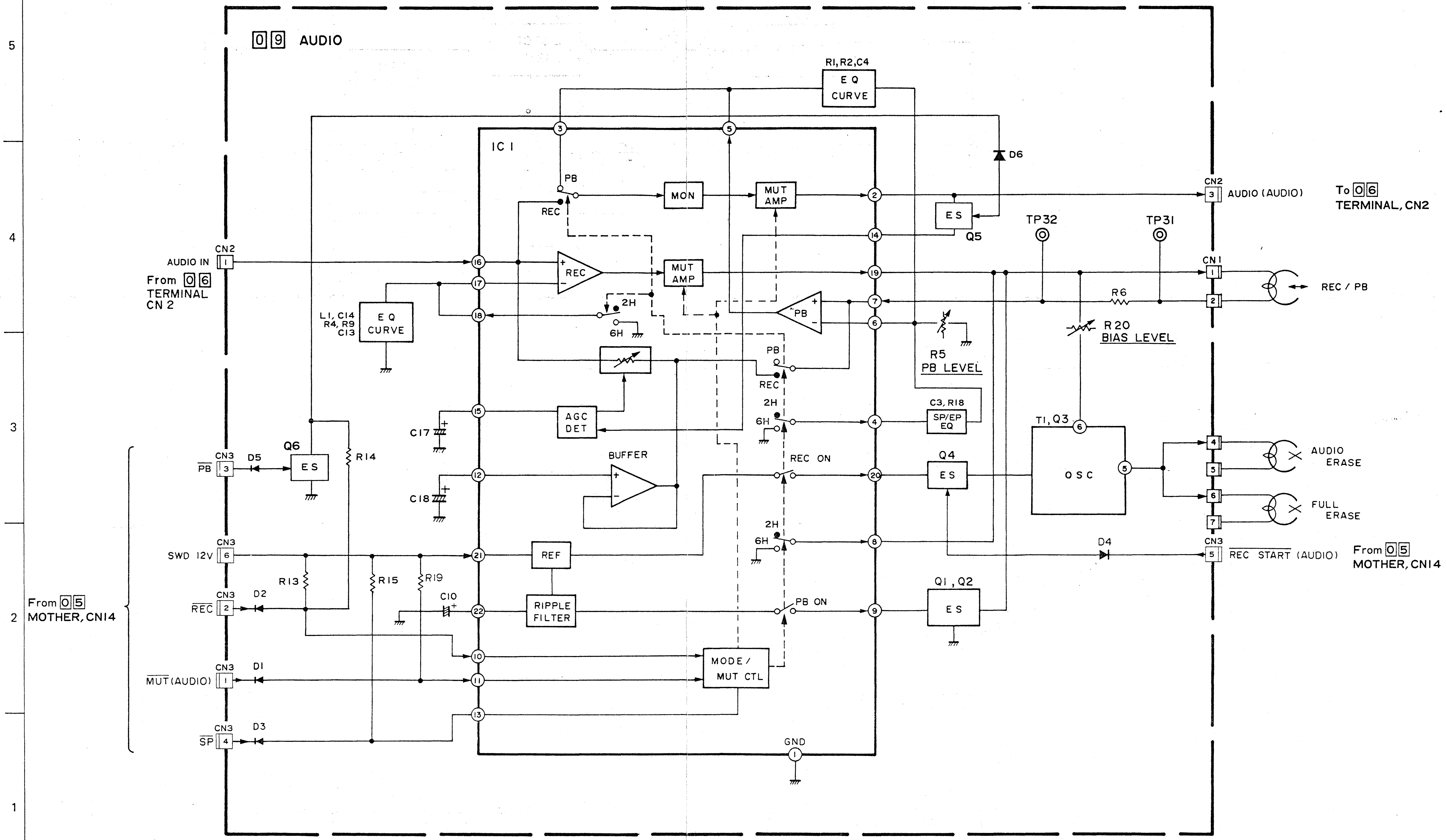
X
XTAL : Crystal

Y
Y : Luminance
YEL : Yellow

3.3 POWER SUPPLY BLOCK DIAGRAM

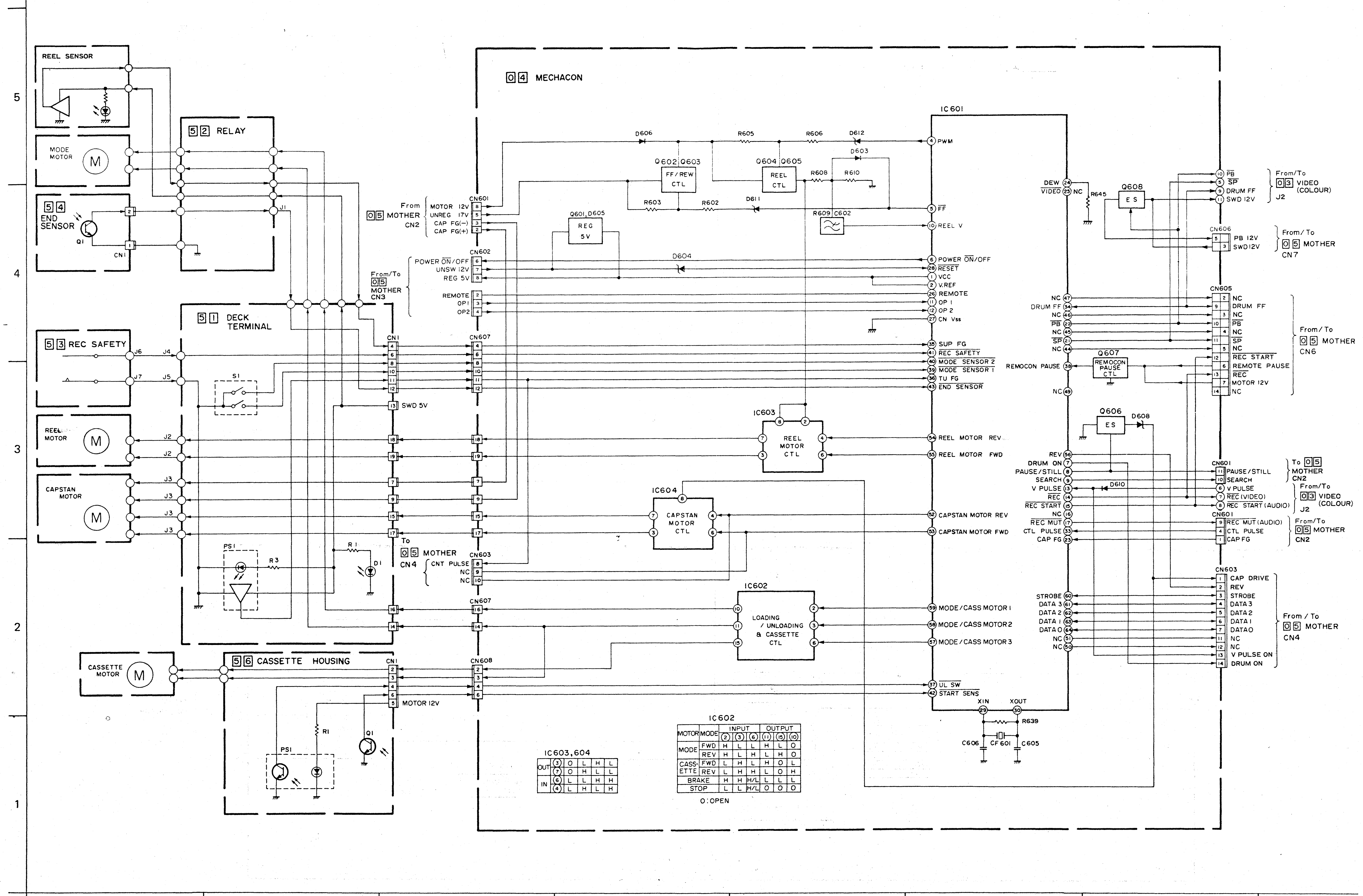

E/EG; AC 220V/50, 60 Hz
EK; AC 240V/50, 60 Hz
F1
TF
F2
F3
D1, D2
RECTIFIER
DS1
RECTIFIER
D4
RECTIFIER
D5
RECTIFIER
10
11
12
8
9
6
7
IC1
MOTOR 12V
IC1
UNREG 12V
REG 12V
IC1
REG 5V
CP4
CP2
CP1
CP3
TP2 SWD12V
TP1 SWD5V
ES
Q2
D12
Q1, D6
REG -30V
CN1 4 MOTOR 12V
CN1 2 SWD 12V
CN1 1 UNSW 12V
CN1 3 SWD 5V
From/To 05 MOTHER, CN1
SWD 5V
To 43 PRE/REC AMP, CN3
CN1 12 +45V
CN1 14 -30V
CN1 7 AC 4.5V or 5V
CN1 15 AC 4.5V or 5V
From/To 05 MOTHER, CN1
01 POWER TRANSFORMER
02 REGULATOR
6
5
4
3
2
1
A
B
C
E
F
G
H

3.4 AUDIO BLOCK DIAGRAM



09 AUDIO
R1, R2, C4
EQ CURVE
IC 1
D6
PB
REC
MON
MUT AMP
ES
Q5
TP32
TP31
CN2
AUDIO (AUDIO)
To 06 TERMINAL, CN2
AUDIO IN
CN2
From 06 TERMINAL CN 2
REC
MUT AMP
PB
2H
6H
L1, C14
R4, R9
C13
EQ CURVE
CN1
REC / PB
R6
R5
PB LEVEL
R20
BIAS LEVEL
AGC DET
C17
C3, R18
SP/EP EQ
T1, Q3
OSC
CN3
PB
D5
Q6
ES
R14
BUFFER
REC ON
Q4
ES
AUDIO ERASE
FULL ERASE
C18
SWD 12V
REF
D4
REC START (AUDIO)
From 05 MOTHER, CN14
R13
R15
R19
C10
Q1, Q2
From 05 MOTHER, CN14
REC
D2
RIPPLE FILTER
PB ON
ES
MODE / MUT CTL
MUT (AUDIO)
D1
SP
D3
GND

3.5 MECHANISM CONTROL BLOCK DIAGRAM


REEL SENSOR
MODE MOTOR
M
54 END SENSOR
Q1
CN1
52 RELAY
J1
53 REC SAFETY
J6
J7
J4
J5
51 DECK TERMINAL
S1
REEL MOTOR
CAPSTAN MOTOR
J2
J3
PS1
R3
R1
D1
CASSETTE MOTOR
56 CASSETTE HOUSING
SWD 5V
To 05 MOTHER CN4
CNT PULSE
NC
MOTOR 12V
04 MECHACON
From 05 MOTHER CN2
MOTOR 12V
UNREG 17V
CAP FG(−)
CAP FG(+)
CN601
CN602
From/To 05 MOTHER CN3
POWER ON/OFF
UNSW 12V
REG 5V
REMOTE
OP1
OP2
CN607
CN603
CN608
D606
Q602,Q603
FF/REW CTL
R603
R602
D611
R605
Q604,Q605
REEL CTL
R606
D612
D603
R608
R610
R609
C602
Q601,D605
REG 5V
D604
IC603
REEL MOTOR CTL
IC604
CAPSTAN MOTOR CTL
IC602
LOADING / UNLOADING & CASSETTE CTL
IC601
PWM
FF
REEL V
POWER ON/OFF
RESET
VCC
V.REF
REMOTE
OP 1
OP 2
CN Vss
SUP FG
REC SAFETY
MODE SENSOR 2
MODE SENSOR 1
TU FG
END SENSOR
REEL MOTOR REV
REEL MOTOR FWD
CAPSTAN MOTOR REV
CAPSTAN MOTOR FWD
MODE/CASS MOTOR 1
MODE/CASS MOTOR 2
MODE/CASS MOTOR 3
UL SW
START SENS
XIN
XOUT
R639
C606
CF601
C605
DEW
VIDEO
NC
R645
Q608
ES
PB
SP
DRUM FF
SWD 12V
From/To 03 VIDEO (COLOUR) J2
CN606
PB 12V
SWD12V
From/To 05 MOTHER CN7
CN605
DRUM FF
REC START
REMOTE PAUSE
REC
MOTOR 12V
From/To 05 MOTHER CN6
Q607
REMOCON PAUSE CTL
REMOCON PAUSE
Q606
ES
D608
D610
REV
DRUM ON
PAUSE/STILL
SEARCH
V PULSE
REC START
REC MUT
CTL PULSE
CAP FG
To 05 MOTHER CN2
REC (VIDEO)
REC START (AUDIO)
From/To 03 VIDEO (COLOUR) J2
REC MUT (AUDIO)
From/To 05 MOTHER CN2
STROBE
DATA 3
DATA 2
DATA 1
DATA 0
CAP DRIVE
V PULSE ON
From / To 05 MOTHER CN4
6
5
4
3
2
1
A
B
C
E
F
G
H

IC603,604

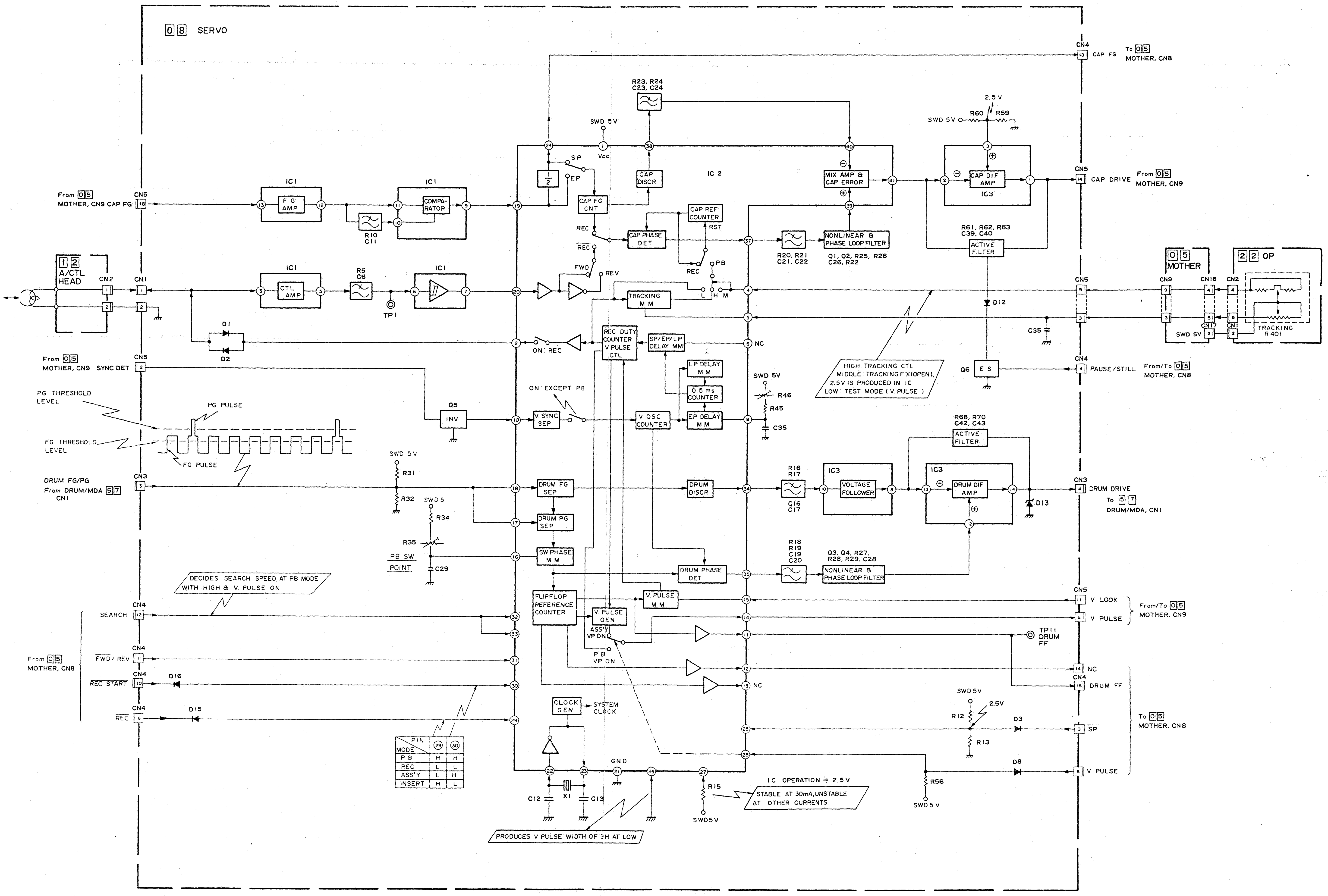
OUT	③	O	L	H	L
	⑦	O	H	L	L
IN	⑥	L	L	H	H
	④	L	H	L	H

IC602

MOTOR	MODE	INPUT ②	INPUT ③	INPUT ⑥	OUTPUT ⑪	OUTPUT ⑮	OUTPUT ⑩
MODE	FWD	H	L	L	H	L	O
	REV	H	L	H	L	H	O
CASS-ETTE	FWD	L	H	L	H	O	L
	REV	L	H	H	L	O	H
BRAKE		H	H	H/L	L	L	L
STOP		L	L	H/L	O	O	O

O: OPEN

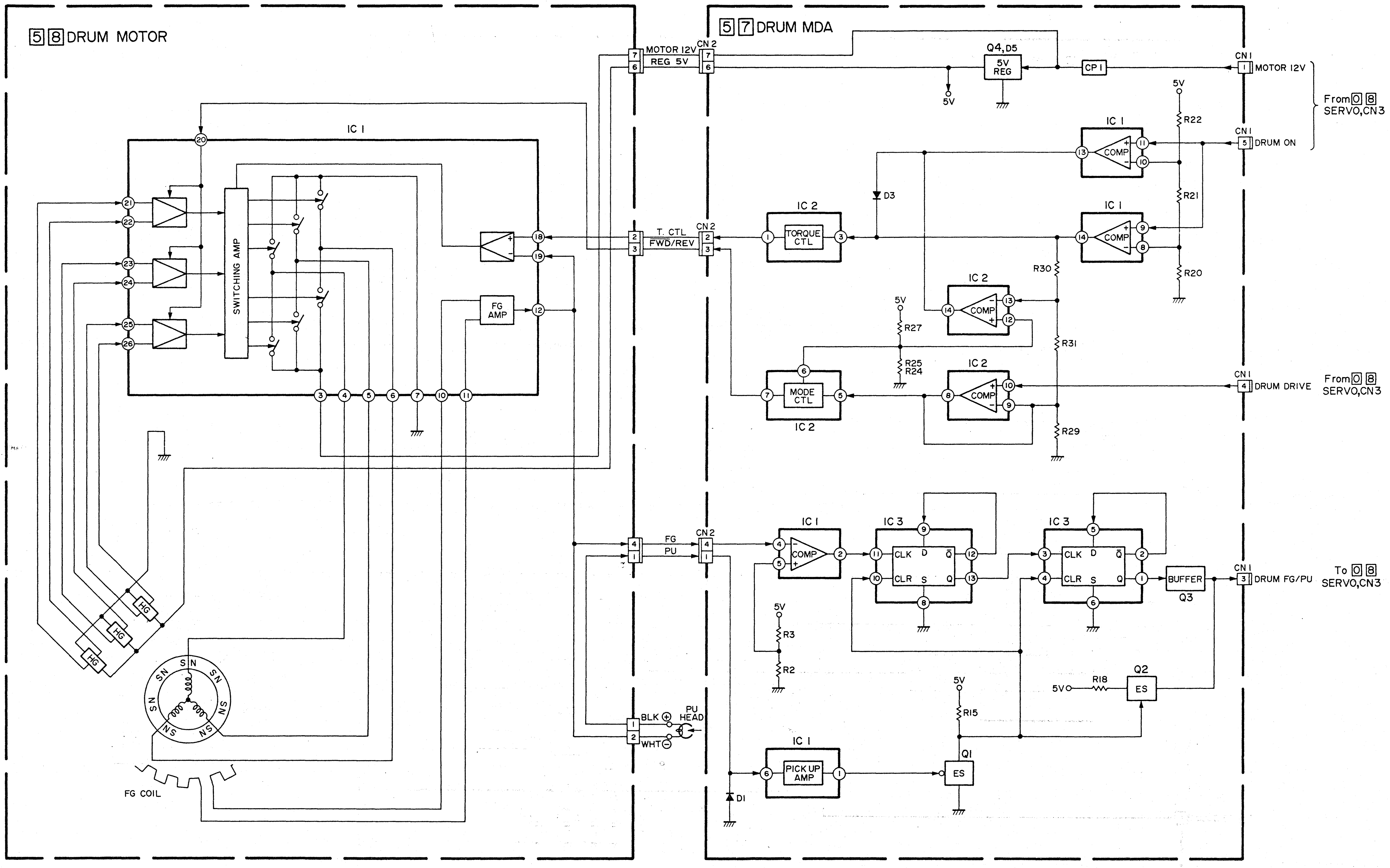
3.6 SERVO BLOCK DIAGRAM



08 SERVO
IC 2
IC1
F G AMP
COMPA-RATOR
R10 C11
CTL AMP
R5 C6
TP1
R23, R24 C23, C24
SWD 5V
Vcc
1/2
SP
EP
CAP DISCR
CAP FG CNT
CAP REF COUNTER
RST
REC
CAP PHASE DET
PB
FWD
REV
L H M
TRACKING M M
REC DUTY COUNTER V PULSE CTL
SP/EP/LP DELAY MM
LP DELAY M M
0.5 ms COUNTER
EP DELAY M M
V OSC COUNTER
V. SYNC SEP
ON: EXCEPT PB
ON: REC
MIX AMP & CAP ERROR
NONLINEAR & PHASE LOOP FILTER
R20, R21 C21, C22
Q1, Q2, R25, R26 C26, R22
2.5 V
R60
R59
CAP DIF AMP
IC3
R61, R62, R63 C39, C40
ACTIVE FILTER
D12
C35
Q6
E S
CN4
CAP FG
To 05 MOTHER, CN8
CN5
CAP DRIVE
From 05 MOTHER, CN9
From 05 MOTHER, CN9 CAP FG
12 A/CTL HEAD
CN2
CN1
D1
D2
From 05 MOTHER, CN9 SYNC DET
Q5
INV
05 MOTHER
22 OP
CN9
CN16
CN17
TRACKING R401
SWD 5V
PAUSE/STILL
From/To 05 MOTHER, CN8
HIGH: TRACKING CTL MIDDLE: TRACKING FIX (OPEN), 2.5V IS PRODUCED IN IC LOW: TEST MODE (V. PULSE)
R46
R45
C35
NC
PG THRESHOLD LEVEL
PG PULSE
FG THRESHOLD LEVEL
FG PULSE
DRUM FG/PG From DRUM/MDA 57 CN1
CN3
SWD 5 V
R31
R32
SWD 5
R34
R35
PB SW POINT
C29
DRUM FG SEP
DRUM PG SEP
SW PHASE M M
DRUM DISCR
DRUM PHASE DET
R16 R17 C16 C17
VOLTAGE FOLLOWER
R68, R70 C42, C43
ACTIVE FILTER
DRUM DIF AMP
D13
DRUM DRIVE
To 57 DRUM/MDA, CN1
R18 R19 C19 C20
Q3, Q4, R27, R28, R29, C28
NONLINEAR & PHASE LOOP FILTER
DECIDES SEARCH SPEED AT PB MODE WITH HIGH & V. PULSE ON
FLIPFLOP REFERENCE COUNTER
V. PULSE M M
V. PULSE GEN
ASS'Y VP ON
PB VP ON
V LOOK
V PULSE
From/To 05 MOTHER, CN9
TP11 DRUM FF
NC
DRUM FF
From 05 MOTHER, CN8
SEARCH
FWD/ REV
REC START
REC
D16
D15
CLOCK GEN
SYSTEM CLOCK
GND
C12
X1
C13
R15
SWD5V
IC OPERATION ≒ 2.5 V
STABLE AT 30mA, UNSTABLE AT OTHER CURRENTS.
PRODUCES V PULSE WIDTH OF 3H AT LOW
SWD 5V
R12
R13
2.5V
D3
SP
D8
R56
SWD 5 V
To 05 MOTHER, CN8

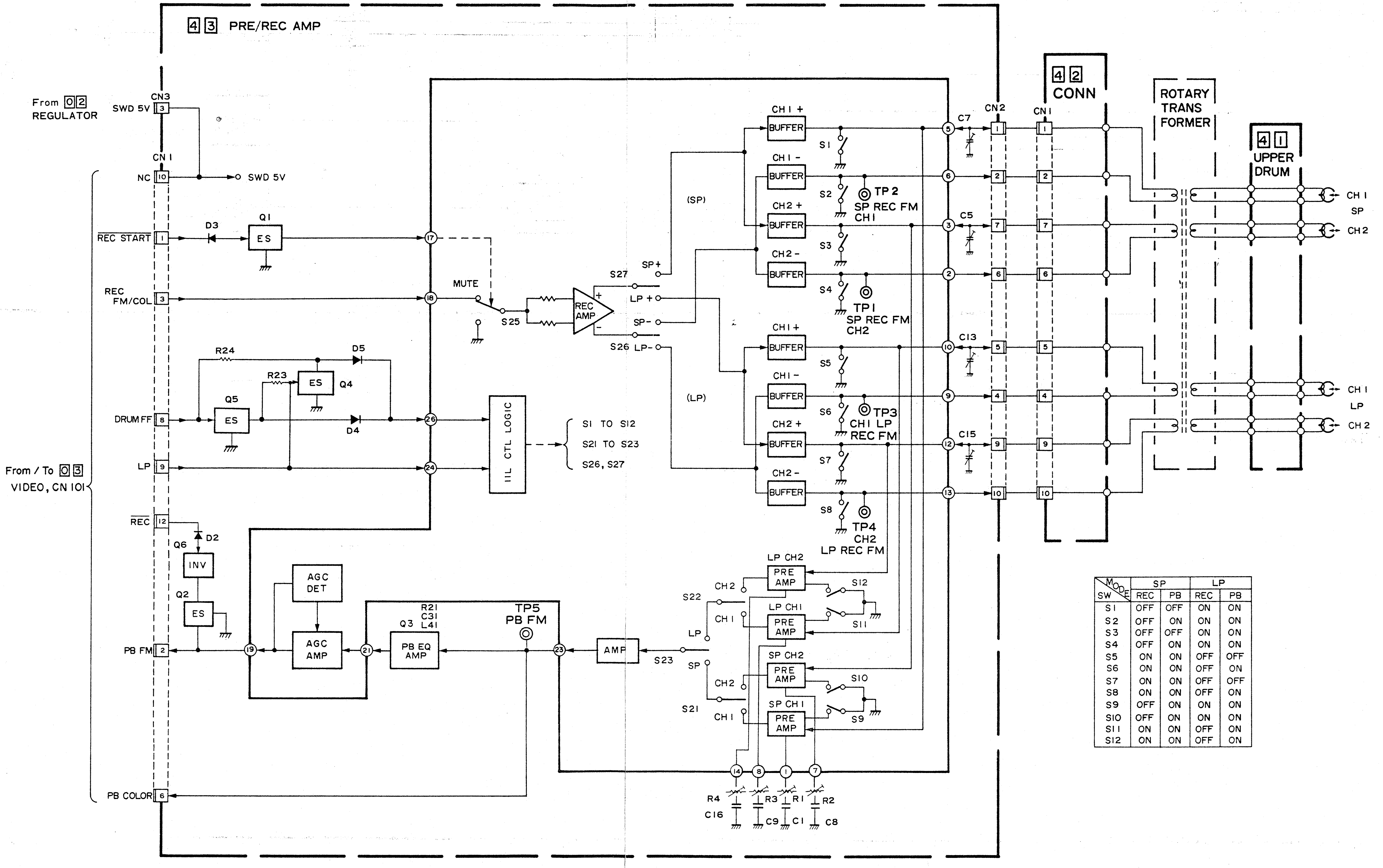
PIN / MODE	㉙	㉚
P B	H	H
REC	L	L
ASS'Y	L	H
INSERT	H	L

3.7 DRUM MDA BLOCK DIAGRAM



5 8 DRUM MOTOR
5 7 DRUM MDA
IC 1
20
21
22
23
24
25
26
SWITCHING AMP
18
19
FG AMP
12
3
4
5
6
7
10
11
HG
HG
HG
S N
FG COIL
MOTOR 12V
REG 5V
T. CTL
FWD/REV
FG
PU
CN 2
7
6
2
3
4
1
BLK ⊕
WHT ⊖
PU HEAD
Q4, D5
5V REG
5V
CP 1
CN 1
MOTOR 12V
From 0 8 SERVO, CN3
DRUM ON
R22
R21
R20
IC 1
COMP
13
11
10
14
9
8
D3
IC 2
TORQUE CTL
IC 2
COMP
R30
R31
R27
R25
R24
MODE CTL
DRUM DRIVE
From 0 8 SERVO, CN3
R29
IC 1
COMP
IC 3
CLK D Q̄
CLR S Q
BUFFER
Q3
DRUM FG/PU
To 0 8 SERVO, CN3
R3
R2
R15
R18
Q2
ES
Q1
ES
PICK UP AMP
D1

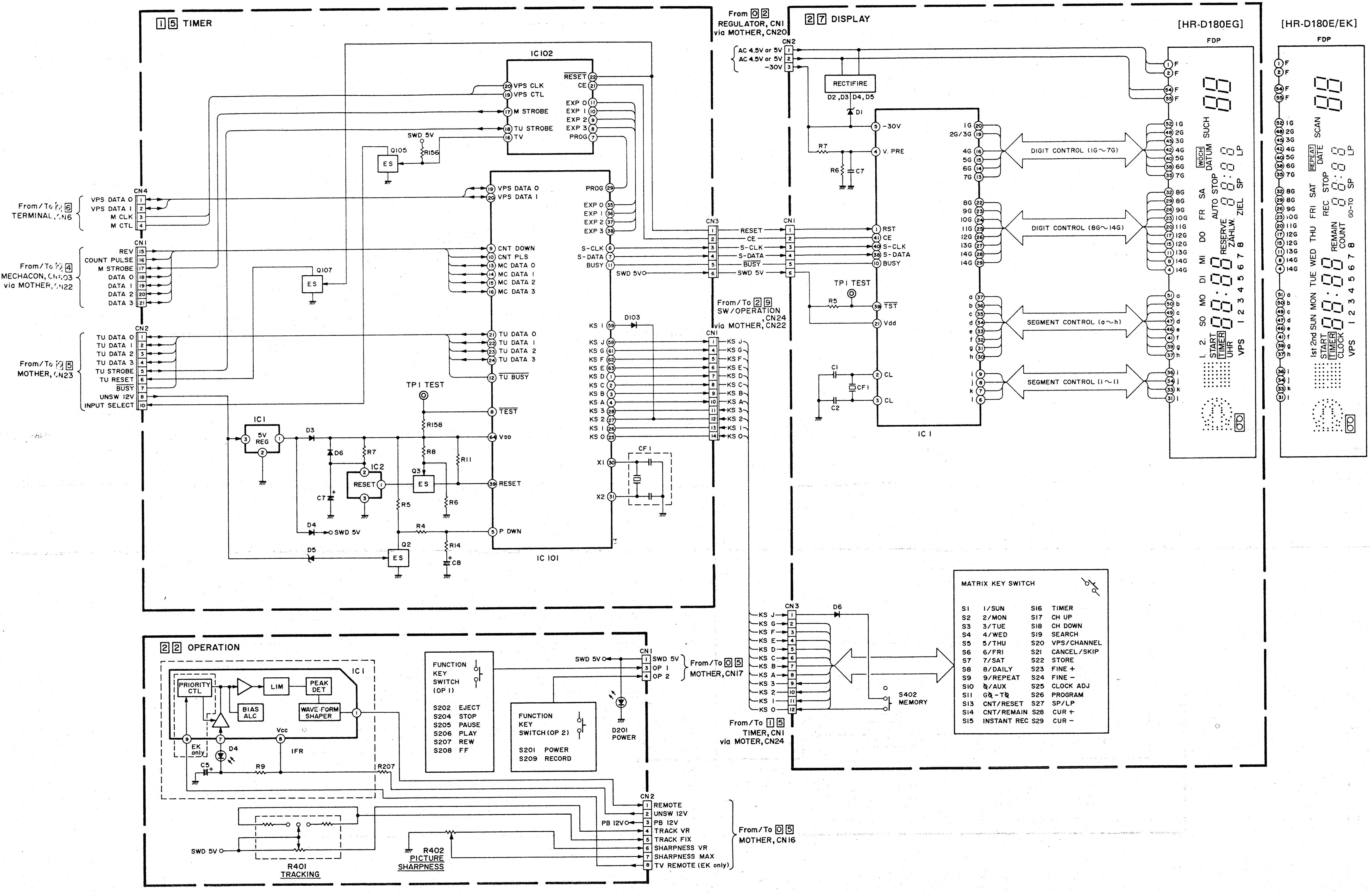
3.8 PRE/REC AMP BLOCK DIAGRAM



43 PRE/REC AMP
From 02 REGULATOR
SWD 5V
CN3
CN1
NC
SWD 5V
REC START
D3
Q1
ES
REC FM/COL
MUTE
S25
S27
SP+
LP+
SP-
S26 LP-
REC AMP
R24
D5
R23
ES
Q4
Q5
ES
DRUM FF
D4
LP
IIL CTL LOGIC
S1 TO S12
S21 TO S23
S26, S27
From / To 03 VIDEO, CN 101
REC
D2
Q6
INV
Q2
ES
PB FM
AGC DET
AGC AMP
R21
C31
L41
Q3
PB EQ AMP
TP5
PB FM
AMP
S23
LP
SP
PB COLOR
(SP)
(LP)
CH1 +
BUFFER
CH1 -
BUFFER
CH2 +
BUFFER
CH2 -
BUFFER
S1
S2
S3
S4
S5
S6
S7
S8
TP2
SP REC FM CH1
TP1
SP REC FM CH2
TP3
CH1 LP REC FM
TP4
CH2 LP REC FM
C7
C5
C13
C15
CN2
LP CH2
PRE AMP
LP CH1
PRE AMP
SP CH2
PRE AMP
SP CH1
PRE AMP
S22
S21
CH1
CH2
S12
S11
S10
S9
R4
C16
R3
C9
R1
C1
R2
C8
42 CONN
CN1
ROTARY TRANS FORMER
41 UPPER DRUM
CH1
SP
CH2
CH1
LP
CH2

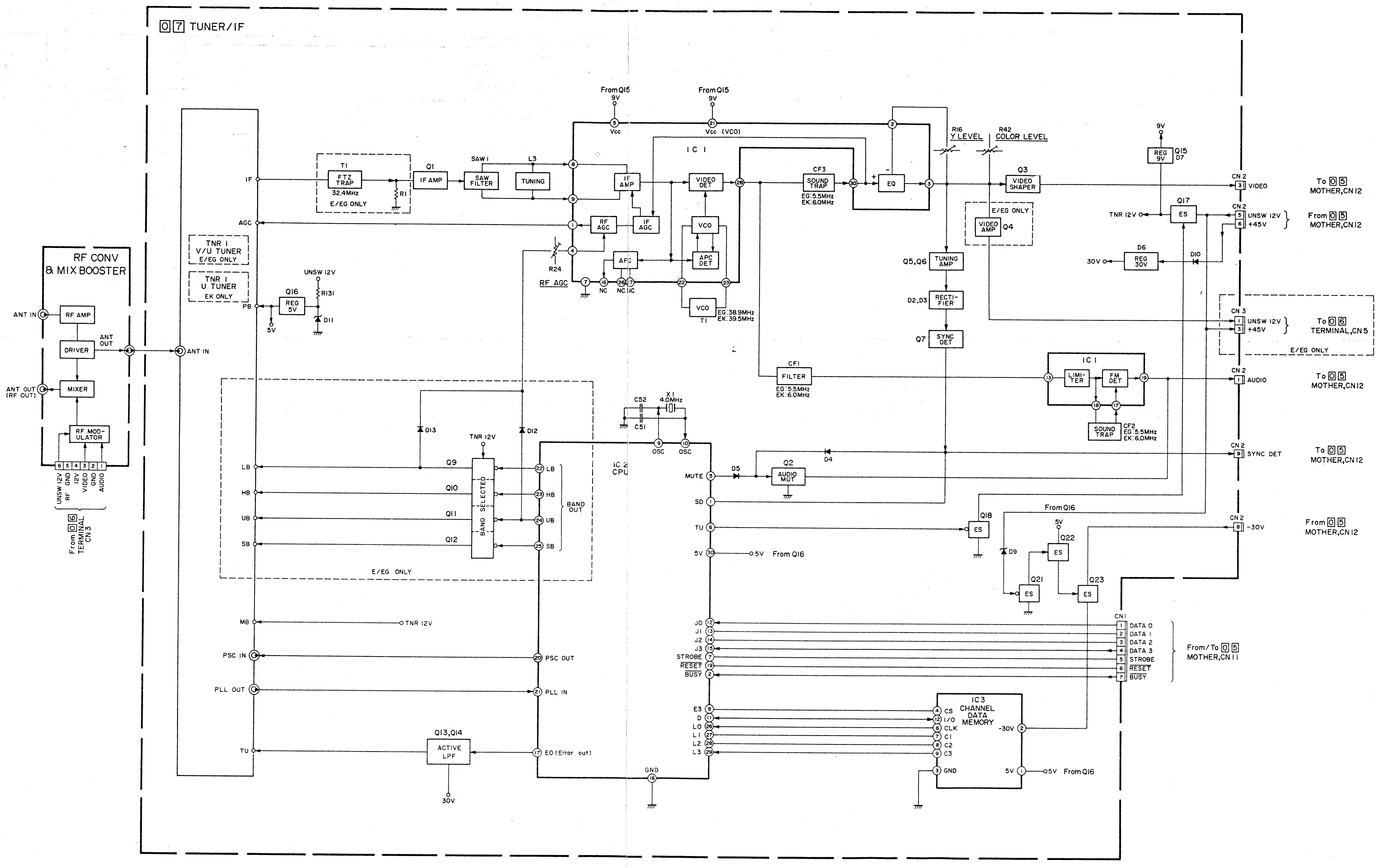
MODE / SW	SP		LP	
	REC	PB	REC	PB
S1	OFF	OFF	ON	ON
S2	OFF	ON	ON	ON
S3	OFF	OFF	ON	ON
S4	OFF	ON	ON	ON
S5	ON	ON	OFF	OFF
S6	ON	ON	OFF	ON
S7	ON	ON	OFF	OFF
S8	ON	ON	OFF	ON
S9	OFF	ON	ON	ON
S10	OFF	ON	ON	ON
S11	ON	ON	OFF	ON
S12	ON	ON	OFF	ON

3.9 TIMER, OPERATION AND SWITCH/DISPLAY BLOCK DIAGRAMS

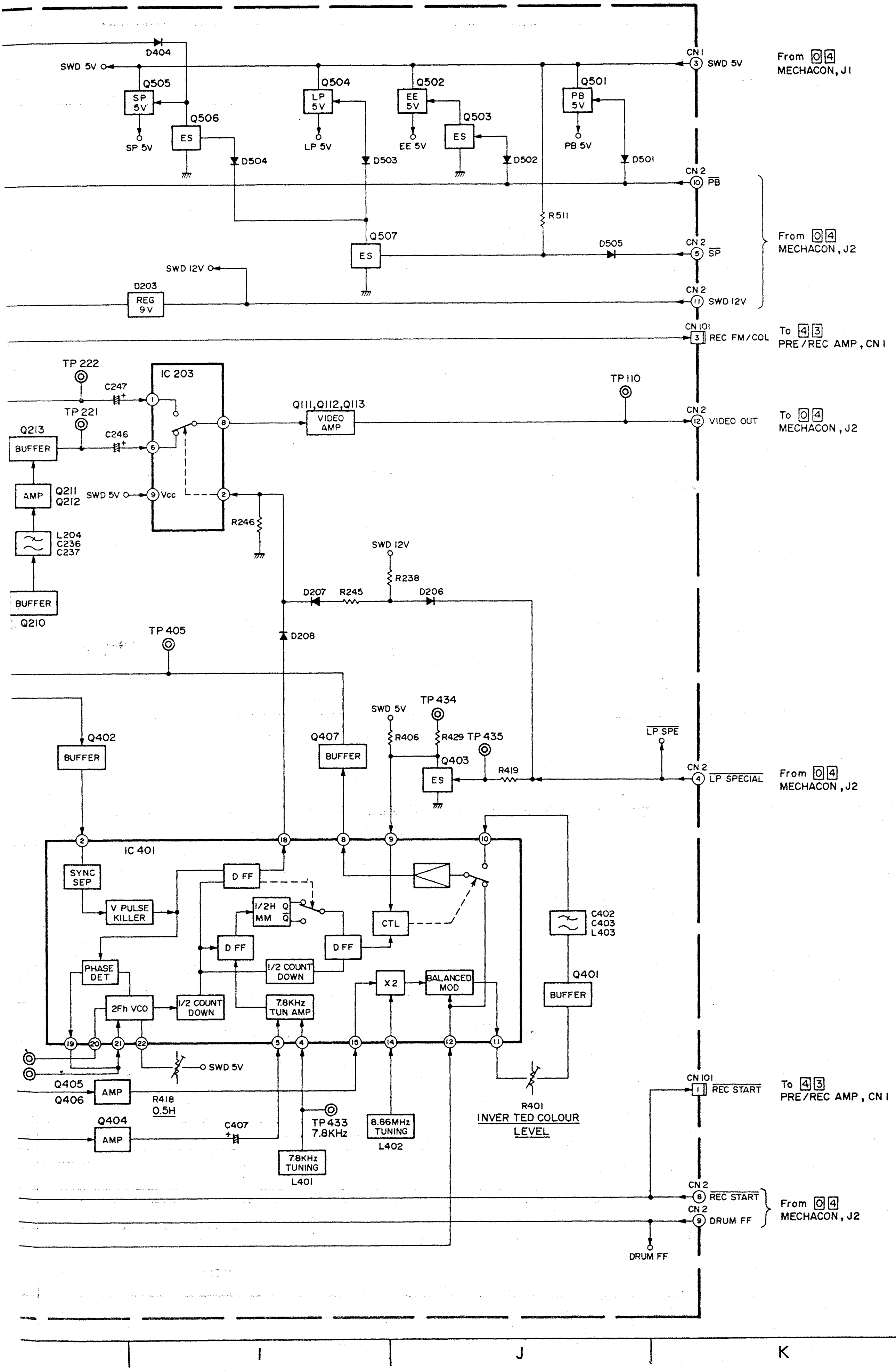


15 TIMER
IC102
VPS CLK
VPS CTL
M STROBE
TU STROBE
TV
RESET
CE
EXP 0
EXP 1
EXP 2
EXP 3
PROG
SWD 5V
Q105
ES
R156
CN4
From/To 26 TERMINAL, CN6
VPS DATA 0
VPS DATA 1
M CLK
M CTL
VPS DATA 0
VPS DATA 1
CN1
From/To 24 MECHACON, CN203 via MOTHER, CN22
REV
COUNT PULSE
M STROBE
DATA 0
DATA 1
DATA 2
DATA 3
Q107
CNT DOWN
CNT PLS
MC DATA 0
MC DATA 1
MC DATA 2
MC DATA 3
CN2
From/To 25 MOTHER, CN23
TU DATA 0
TU DATA 1
TU DATA 2
TU DATA 3
TU STROBE
TU RESET
BUSY
UNSW 12V
INPUT SELECT
TU DATA 0
TU DATA 1
TU DATA 2
TU DATA 3
TU BUSY
TEST
TP1 TEST
R158
IC1
5V REG
D3
D6
R7
R8
R11
IC2
RESET
Q3
ES
C7
R5
R6
Vdd
RESET
D4
SWD 5V
R4
D5
Q2
R14
C8
P DOWN
IC 101
PROG
EXP 0
EXP 1
EXP 2
EXP 3
S-CLK
S-DATA
BUSY
SWD 5V
KS I
D103
KS J
KS G
KS F
KS E
KS D
KS C
KS B
KS A
KS 3
KS 2
KS 1
KS 0
CF1
X1
X2
From 02 REGULATOR, CN1 via MOTHER, CN20
CN2
AC 4.5V or 5V
AC 4.5V or 5V
-30V
CN3
RESET
CE
S-CLK
S-DATA
BUSY
SWD 5V
From/To 29 SW/OPERATION, CN24 via MOTHER, CN22
CN1
KS J
KS G
KS F
KS E
KS D
KS C
KS B
KS A
KS 3
KS 2
KS 1
KS 0
27 DISPLAY
[HR-D180EG]
[HR-D180E/EK]
FDP
RECTIFIRE
D2, D3, D4, D5
D1
-30V
R7
V. PRE
R6
C7
CN1
RST
CE
S-CLK
S-DATA
BUSY
TP1 TEST
R5
TST
Vdd
C1
CF1
C2
CL
CL
IC 1
1G
2G/3G
4G
5G
6G
7G
8G
9G
10G
11G
12G
13G
14G
14G
a
b
c
d
e
f
g
h
i
j
k
l
DIGIT CONTROL (1G~7G)
DIGIT CONTROL (8G~14G)
SEGMENT CONTROL (a~h)
SEGMENT CONTROL (i~l)
F
SUCH
WOCH DATUM
AUTO STOP
SA FR DO MI DI MO SO
RESERVE ZÄHLW.
ZIEL
LP SP
1. 2. START TIMER UHR
VPS 1 2 3 4 5 6 7 8
SCAN
REPEAT DATE
STOP
SAT FRI THU WED TUE MON SUN
REC
REMAIN COUNT
GO-TO
1st 2nd START TIMER CLOCK
VPS 1 2 3 4 5 6 7 8
CN3
D6
KS J
KS G
KS F
KS E
KS D
KS C
KS B
KS A
KS 3
KS 2
KS 1
KS 0
S402 MEMORY
From/To 15 TIMER, CN1 via MOTER, CN24
MATRIX KEY SWITCH
S1 1/SUN
S2 2/MON
S3 3/TUE
S4 4/WED
S5 5/THU
S6 6/FRI
S7 7/SAT
S8 8/DAILY
S9 9/REPEAT
S10 0/AUX
S11 G0-T0
S13 CNT/RESET
S14 CNT/REMAIN
S15 INSTANT REC
S16 TIMER
S17 CH UP
S18 CH DOWN
S19 SEARCH
S20 VPS/CHANNEL
S21 CANCEL/SKIP
S22 STORE
S23 FINE +
S24 FINE −
S25 CLOCK ADJ
S26 PROGRAM
S27 SP/LP
S28 CUR +
S29 CUR −
22 OPERATION
IC1
PRIORITY CTL
LIM
PEAK DET
BIAS ALC
WAVE FORM SHAPER
EK only
D4
Vcc
IFR
C5
R9
R207
FUNCTION KEY SWITCH (OP 1)
S202 EJECT
S204 STOP
S205 PAUSE
S206 PLAY
S207 REW
S208 FF
FUNCTION KEY SWITCH (OP 2)
S201 POWER
S209 RECORD
SWD 5V
CN1
SWD 5V
OP 1
OP 2
From/To 05 MOTHER, CN17
D201 POWER
CN2
REMOTE
UNSW 12V
PB 12V
TRACK VR
TRACK FIX
SHARPNESS VR
SHARPNESS MAX
TV REMOTE (EK only)
From/To 05 MOTHER, CN16
PB 12V
SWD 5V
R401 TRACKING
R402 PICTURE SHARPNESS
A
B
C
E
F
G
H
1
2
3
4
5
6

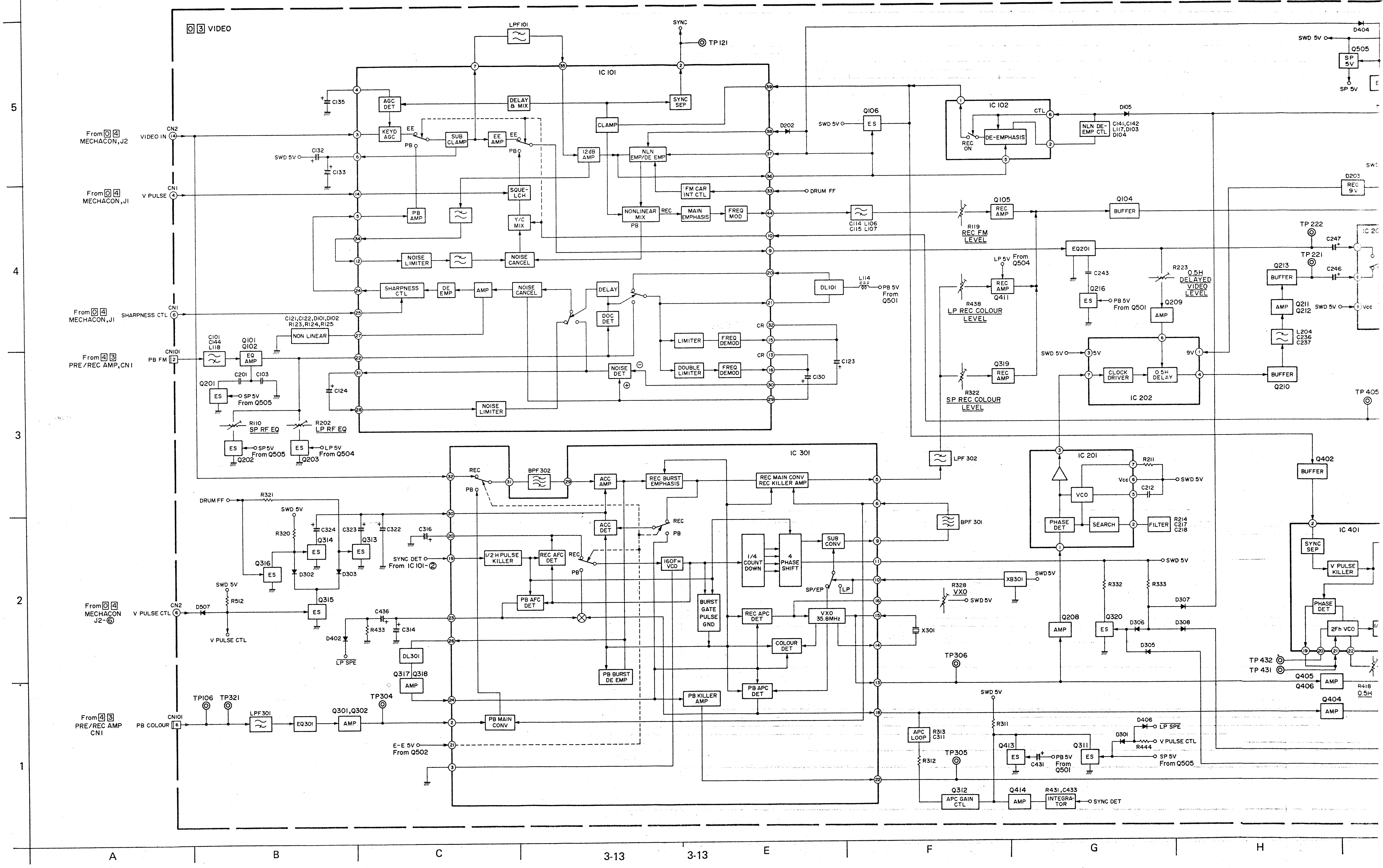
3.10 TUNER/IF BLOCK DIAGRAM



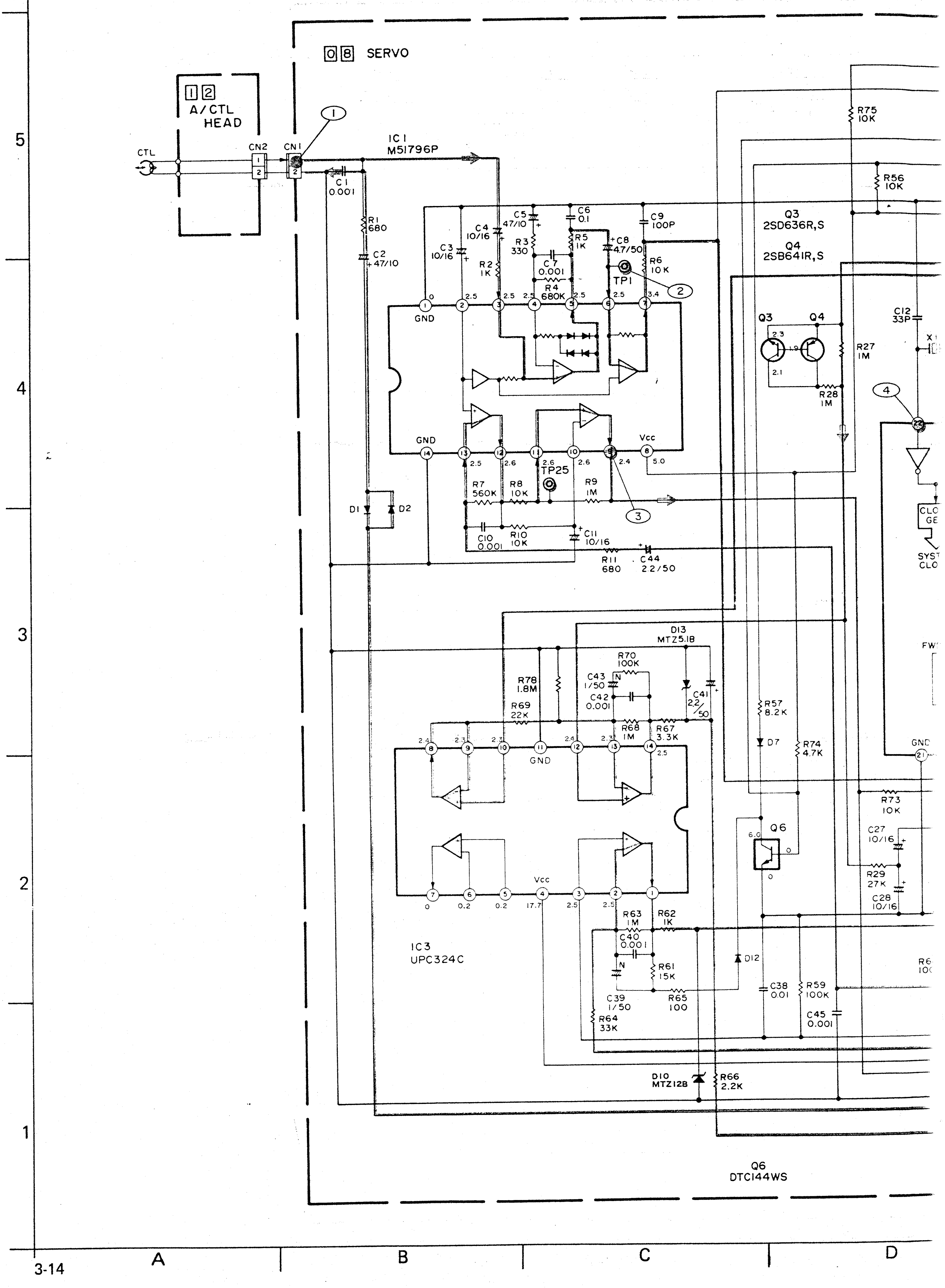
07 TUNER/IF
RF CONV & MIX BOOSTER
ANT IN
RF AMP
DRIVER
ANT OUT
MIXER
ANT OUT (RF OUT)
RF MOD-ULATOR
6 5 4 3 2 1
UNSW 12V
RF GND
12V
VIDEO
GND
AUDIO
From 06 TERMINAL CN3
ANT IN
IF
AGC
TNR 1 V/U TUNER E/EG ONLY
TNR 1 U TUNER EK ONLY
PB
Q16
REG 5V
UNSW 12V
R131
D11
5V
T1
FTZ TRAP
32.4MHz
E/EG ONLY
R1
Q1
IF AMP
SAW 1
SAW FILTER
L3
TUNING
From Q15 9V
Vcc
From Q15 9V
Vcc (VCO)
IC 1
IF AMP
VIDEO DET
RF AGC
IF AGC
VCO
AFC
APC DET
R24
RF AGC
NC
NC NC
VCO
T1
EG:38.9MHz
EK:39.5MHz
CF3
SOUND TRAP
EG:5.5MHz
EK:6.0MHz
EQ
R16 Y LEVEL
R42 COLOR LEVEL
Q3
VIDEO SHAPER
E/EG ONLY
VIDEO AMP
Q4
Q5,Q6
TUNING AMP
D2,D3
RECTI-FIER
Q7
SYNC DET
9V
REG 9V
Q15
D7
Q17
ES
TNR 12V
D6
REG 30V
30V
D10
CN 2
3 VIDEO
5 UNSW 12V
6 +45V
To 05 MOTHER,CN12
From 05 MOTHER,CN12
CN 3
1 UNSW 12V
3 +45V
To 06 TERMINAL,CN5
E/EG ONLY
CF1
FILTER
EG:5.5MHz
EK:6.0MHz
IC 1
LIMI-TER
FM DET
SOUND TRAP
CF2
EG:5.5MHz
EK:6.0MHz
CN 2
1 AUDIO
To 05 MOTHER,CN12
C52
X1 4.0MHz
C51
OSC
OSC
D13
D12
TNR 12V
Q9
Q10
Q11
Q12
BAND SELECTED
LB
HB
UB
SB
BAND OUT
E/EG ONLY
IC 2 CPU
MUTE
D5
Q2
AUDIO MUT
D4
CN 2
9 SYNC DET
To 05 MOTHER,CN12
SD
TU
5V
5V From Q16
Q18
ES
From Q16
5V
Q22
ES
D9
Q21
ES
Q23
ES
CN 2
8 -30V
From 05 MOTHER,CN12
MB
TNR 12V
PSC IN
PSC OUT
PLL OUT
PLL IN
Q13,Q14
ACTIVE LPF
TU
30V
EO (Error out)
GND
J0
J1
J2
J3
STROBE
RESET
BUSY
CN1
1 DATA 0
2 DATA 1
3 DATA 2
4 DATA 3
5 STROBE
6 RESET
7 BUSY
From/To 05 MOTHER,CN11
E3
D
L0
L1
L2
L3
IC3 CHANNEL DATA MEMORY
CS
I/O
CLK
C1
C2
C3
GND
-30V
5V
5V From Q16

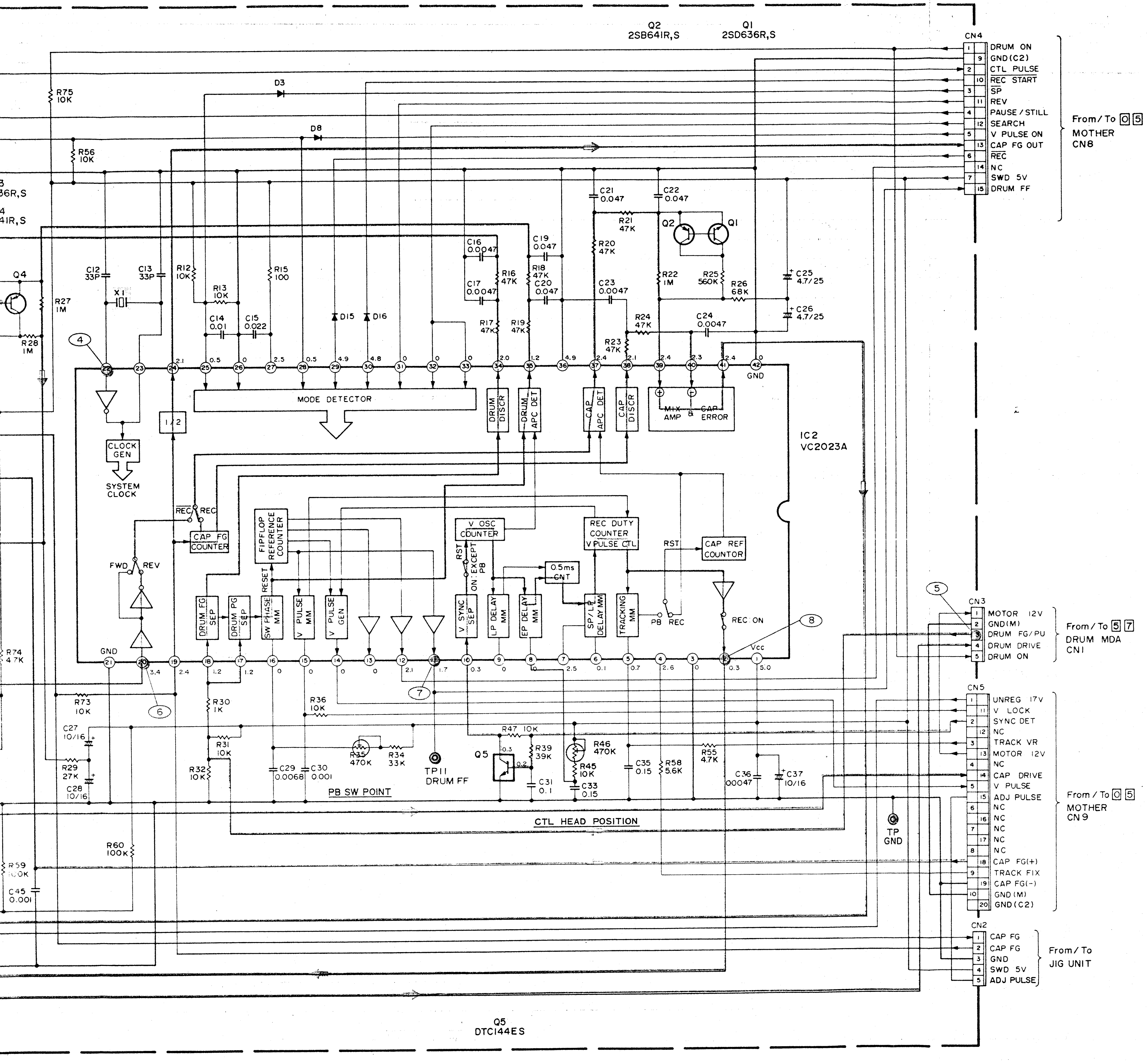

D404
SWD 5V
Q505
SP 5V
SP 5V
Q506
ES
D504
Q504
LP 5V
LP 5V
D503
Q502
EE 5V
EE 5V
Q503
ES
D502
Q501
PB 5V
PB 5V
D501
CN 1
③ SWD 5V
From 04 MECHACON, J1
CN 2
⑩ PB
R511
Q507
ES
D505
CN 2
⑤ SP
From 04 MECHACON, J2
SWD 12V
D203
REG 9V
CN 2
⑪ SWD 12V
CN 101
3 REC FM/COL
To 43 PRE/REC AMP, CN 1
TP 222
C247
IC 203
TP 221
Q213
BUFFER
C246
Vcc
Q111, Q112, Q113
VIDEO AMP
TP 110
CN 2
⑫ VIDEO OUT
To 04 MECHACON, J2
AMP
Q211
Q212
SWD 5V
R246
L204
C236
C237
BUFFER
Q210
SWD 12V
R238
D207
R245
D206
TP 405
D208
TP 434
SWD 5V
R406
R429
TP 435
Q402
BUFFER
Q407
BUFFER
Q403
ES
R419
LP SPE
CN 2
④ LP SPECIAL
From 04 MECHACON, J2
IC 401
SYNC SEP
V PULSE KILLER
D FF
1/2H MM Q Q̄
D FF
D FF
CTL
1/2 COUNT DOWN
PHASE DET
2Fh VCO
1/2 COUNT DOWN
7.8KHz TUN AMP
X2
BALANCED MOD
C402
C403
L403
Q401
BUFFER
SWD 5V
Q405
Q406
AMP
R418
0.5H
Q404
AMP
C407
TP 433
7.8KHz
7.8KHz TUNING
L401
8.86MHz TUNING
L402
R401
INVER TED COLOUR LEVEL
CN 101
1 REC START
To 43 PRE/REC AMP, CN 1
CN 2
⑧ REC START
CN 2
⑨ DRUM FF
From 04 MECHACON, J2
DRUM FF
I
J
K

3.11 VIDEO BLOCK DIAGRAM


03 VIDEO
IC 101
IC 102
IC 202
IC 201
IC 301
IC 401
LPF 101
SYNC
TP 121
SYNC SEP
DELAY & MIX
AGC DET
KEYD AGC
SUB CLAMP
EE AMP
EE
PB
CLAMP
12dB AMP
NLN EMP/DE EMP
D202
Q106
ES
SWD 5V
FM CAR INT CTL
DRUM FF
NONLINEAR MIX
REC
MAIN EMPHASIS
FREQ MOD
C114 L106
C115 L107
SQUE-LCH
Y/C MIX
PB AMP
NOISE LIMITER
NOISE CANCEL
SHARPNESS CTL
DE EMP
AMP
DELAY
DOC DET
DL101
L114
PB 5V From Q501
LIMITER
FREQ DEMOD
DOUBLE LIMITER
CR
C123
C130
C124
NON LINEAR
C121,C122,D101,D102
R123,R124,R125
C135
C132
C133
From 04 MECHACON,J2
VIDEO IN
CN2
From 04 MECHACON,J1
V PULSE
CN1
SHARPNESS CTL
From 43 PRE/REC AMP,CN1
PB FM
CN101
C101 C144 L118
Q101 Q102
EQ AMP
C201
C103
Q201
SP 5V From Q505
R110 SP RF EQ
R202 LP RF EQ
Q202
Q203
LP 5V From Q504
REC ON
DE-EMPHASIS
CTL
D105
NLN DE-EMP CTL
C141,C142 L117,D103 D104
Q105
REC AMP
R119 REC FM LEVEL
Q104
BUFFER
EQ201
C243
Q216
PB 5V From Q501
LP 5V From Q504
Q411
R438 LP REC COLOUR LEVEL
R223 0.5H DELAYED VIDEO LEVEL
Q209
Q319
R322 SP REC COLOUR LEVEL
5V
9V
CLOCK DRIVER
0.5H DELAY
Q210
D404
Q505
SP 5V
D203
REC 9V
TP 222
C247
TP 221
C246
Q213
Q211 Q212
Vcc
L204 C236 C237
TP 405
BPF 302
ACC AMP
REC BURST EMPHASIS
REC MAIN CONV REC KILLER AMP
LPF 302
ACC DET
BPF 301
DRUM FF
R321
R320
C324
C323
C322
Q314
Q313
C316
Q316
D302
D303
SYNC DET From IC 101-②
1/2 H PULSE KILLER
REC AFC DET
160FH VCO
1/4 COUNT DOWN
4 PHASE SHIFT
SUB CONV
SP/EP
LP
XB301
R328 VXO
BURST GATE PULSE GND
REC APC DET
VXO 35.8MHz
X301
COLOUR DET
PB AFC DET
PB BURST DE EMP
PB APC DET
PB KILLER AMP
Q315
SWD 5V
R512
D507
From 04 MECHACON J2-⑥
V PULSE CTL
C436
R433
C314
D402
LP SPE
DL301
Q317 Q318
TP106
TP321
TP304
LPF301
EQ301
Q301,Q302
From 43 PRE/REC AMP CN1
PB COLOUR
PB MAIN CONV
E-E 5V From Q502
TP306
TP305
APC LOOP
R313 C311
R312
Q312
APC GAIN CTL
Q414
R431,C433
INTEGRA-TOR
SYNC DET
R311
Q413
C431
Q311
D301
R444
D406
V PULSE CTL
SP 5V From Q505
R211
C212
VCO
PHASE DET
SEARCH
FILTER
R214 C217 C218
Q208
R332
R333
Q320
D306
D307
D308
D305
Q402
SYNC SEP
V PULSE KILLER
2Fh VCO
TP 432
TP 431
Q405 Q406
Q404
R418 0.5H
6
5
4
3
2
1
A
B
C
D
E
F
G
H

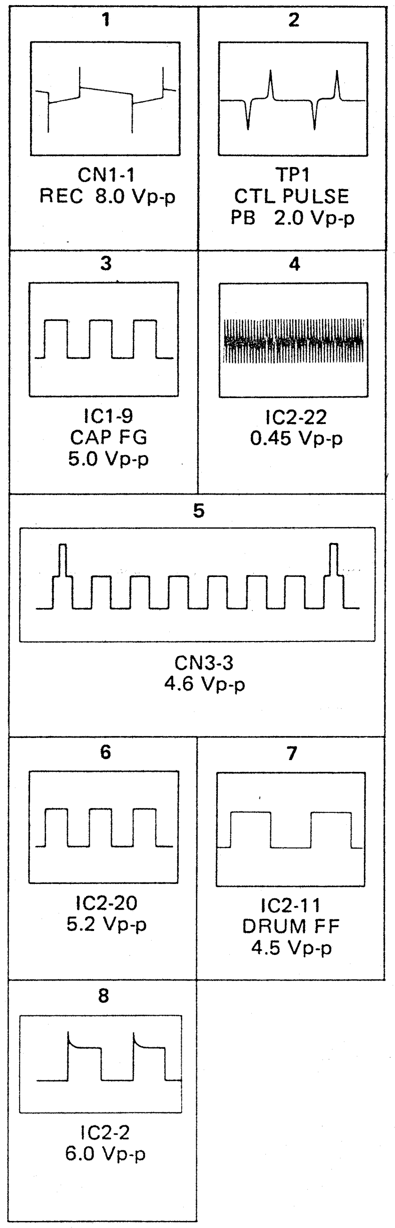
3.12 SERVO SCHEMATIC DIAGRAM


6
5
4
3
2
1
08 SERVO
12 A/CTL HEAD
CTL
CN2
CN1
1
2
①
IC1 M51796P
C1 0.001
R1 680
C2 47/10
C3 10/16
C4 10/16
C5 47/10
R3 330
R2 1K
C7 0.001
R4 680K
C6 0.1
R5 1K
C8 4.7/50
C9 100P
R6 10K
TP1
②
GND
Vcc
TP25
R7 560K
R8 10K
R9 1M
③
C10 0.001
R10 10K
C11 10/16
R11 680
C44 2.2/50
D1
D2
Q3 2SD636R,S
Q4 2SB641R,S
R75 10K
R56 10K
R27 1M
R28 1M
C12 33P
④
CLO GE
SYST CLO
FW
D13 MTZ5.1B
R70 100K
C43 1/50
C42 0.001
R78 1.8M
R69 22K
C41 22/50
R68 1M
R67 3.3K
R57 8.2K
D7
R74 4.7K
GND
IC3 UPC324C
Q6
R73 10K
C27 10/16
R29 27K
C28 10/16
R63 1M
R62 1K
C40 0.001
R61 15K
D12
C39 1/50
R65 100
R64 33K
C38 0.01
R59 100K
C45 0.001
D10 MTZ12B
R66 2.2K
Q6 DTC144WS
A
B
C
D



Q2
2SB641R,S
Q1
2SD636R,S
CN4
1 DRUM ON
9 GND(C2)
2 CTL PULSE
10 REC START
3 SP
11 REV
4 PAUSE / STILL
12 SEARCH
5 V PULSE ON
13 CAP FG OUT
6 REC
14 NC
7 SWD 5V
15 DRUM FF
From / To 0 5
MOTHER
CN8
R75 10K
D3
D8
R56 10K
Q4
C12 33P
C13 33P
X1
R12 10K
R13 10K
R15 100
C14 0.01
C15 0.022
D15
D16
C16 0.0047
C17 0.0047
R16 47K
R17 47K
C19 0.047
R18 47K
C20 0.047
R19 47K
C21 0.047
C22 0.047
R21 47K
R20 47K
C23 0.0047
R22 1M
R25 560K
R26 68K
R24 47K
R23 47K
C24 0.0047
C25 4.7/25
C26 4.7/25
R27 1M
R28 1M
GND
MODE DETECTOR
DRUM DISCR
DRUM APC DET
CAP APC DET
CAP DISCR
MIX AMP & CAP ERROR
IC2
VC2023A
1/2
CLOCK GEN
SYSTEM CLOCK
REC
CAP FG COUNTER
FWD
REV
FIPFLOP REFERENCE COUNTER
RESET
V OSC COUNTER
RST
ON: EXCEPT PB
REC DUTY COUNTER
V PULSE CTL
RST
CAP REF COUNTOR
0.5ms CNT
DRUM FG SEP
DRUM PG SEP
SW PHASE MM
V PULSE MM
V PULSE GEN
V SYNC SEP
LP DELAY MM
EP DELAY MM
SP/LP DELAY MM
TRACKING MM
PB
REC
REC: ON
Vcc
R74 4.7K
R73 10K
R30 1K
R36 10K
C27 10/16
R29 27K
C28 10/16
R31 10K
R32 10K
C29 0.0068
C30 0.001
R35 470K
R34 33K
TP11 DRUM FF
PB SW POINT
R47 10K
R39 39K
Q5
C31 0.1
R46 470K
R45 10K
C33 0.15
C35 0.15
R58 5.6K
R55 4.7K
C36 .00047
C37 10/16
CTL HEAD POSITION
TP GND
R60 100K
R59 10K
C45 0.001
CN3
1 MOTOR 12V
2 GND(M)
3 DRUM FG/PU
4 DRUM DRIVE
5 DRUM ON
From / To 5 7
DRUM MDA
CN1
CN5
1 UNREG 17V
11 V LOCK
2 SYNC DET
12 NC
3 TRACK VR
13 MOTOR 12V
4 NC
14 CAP DRIVE
5 V PULSE
15 ADJ PULSE
6 NC
16 NC
7 NC
17 NC
8 NC
18 CAP FG(+)
9 TRACK FIX
19 CAP FG(-)
10 GND(M)
20 GND(C2)
From / To 0 5
MOTHER
CN9
CN2
1 CAP FG
2 CAP FG
3 GND
4 SWD 5V
5 ADJ PULSE
From / To
JIG UNIT
Q5
DTC144ES

— Waveforms of servo circuit —



1 CN1-1 REC 8.0 Vp-p

2 TP1 CTL PULSE PB 2.0 Vp-p

3 IC1-9 CAP FG 5.0 Vp-p

4 IC2-22 0.45 Vp-p

5 CN3-3 4.6 Vp-p

6 IC2-20 5.2 Vp-p

7 IC2-11 DRUM FF 4.5 Vp-p

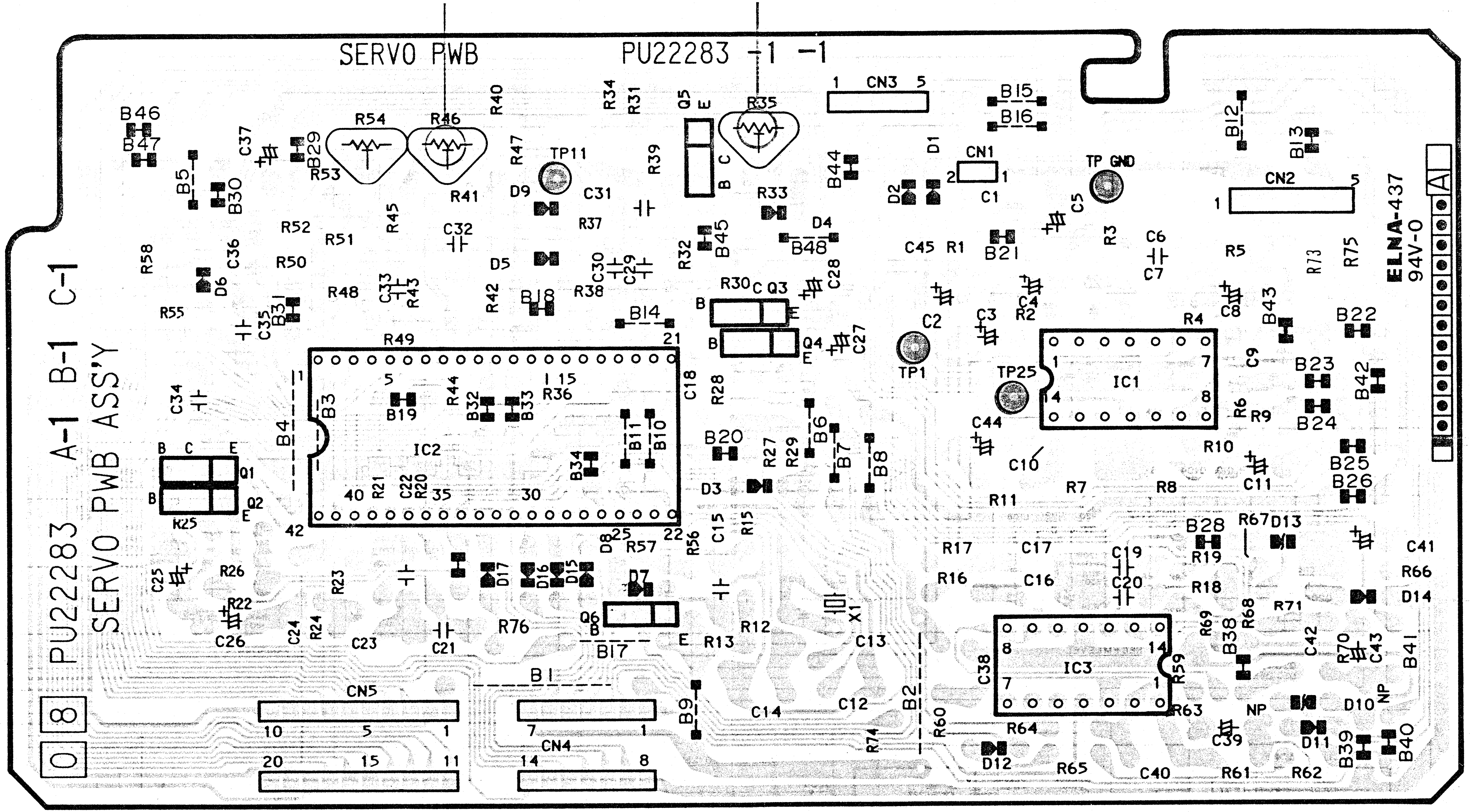
8 IC2-2 6.0 Vp-p

3.13 SERVO CIRCUIT BOARD

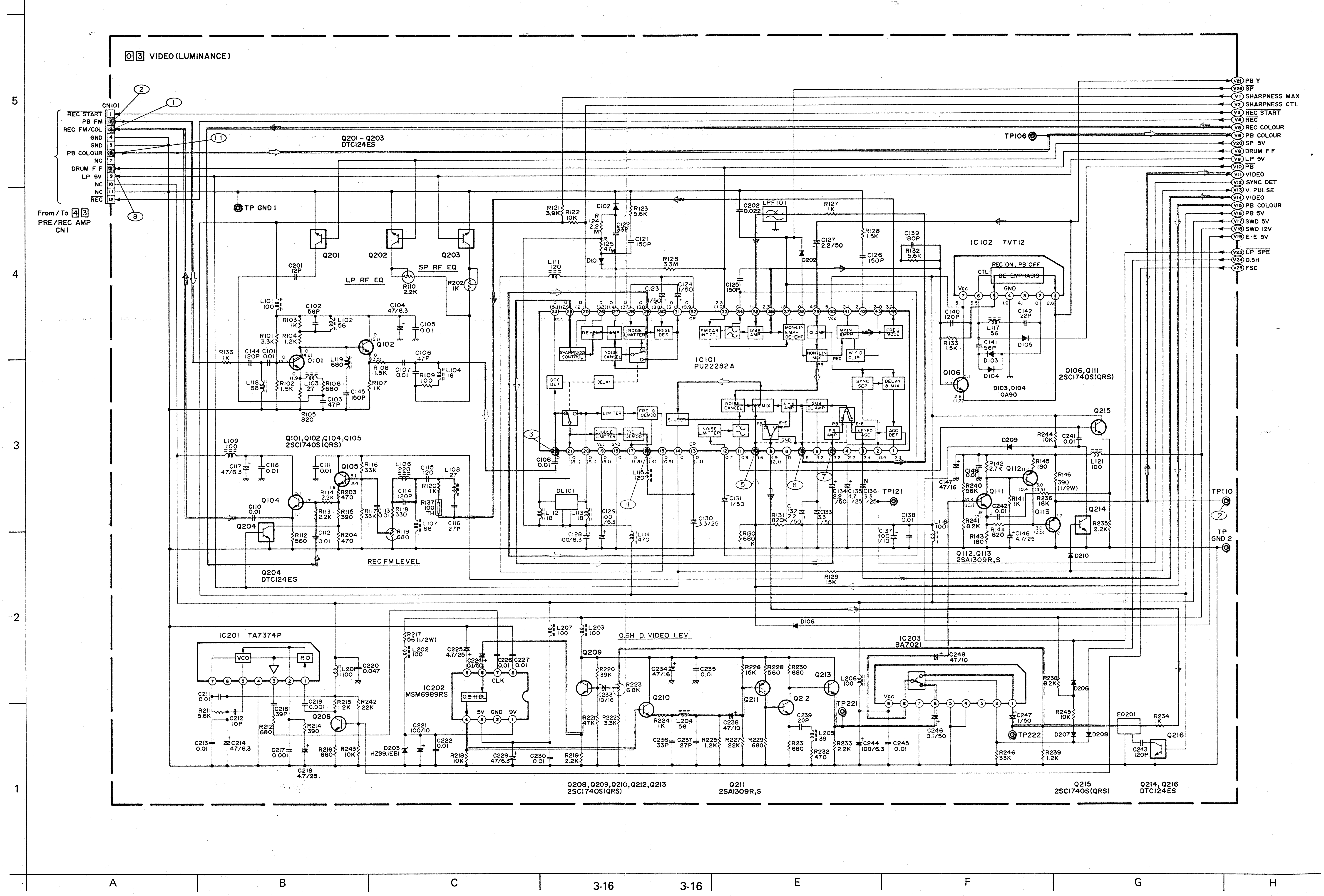
— SERVO —

R46
CTL HEAD POSITION

R35
PB. SW POINT

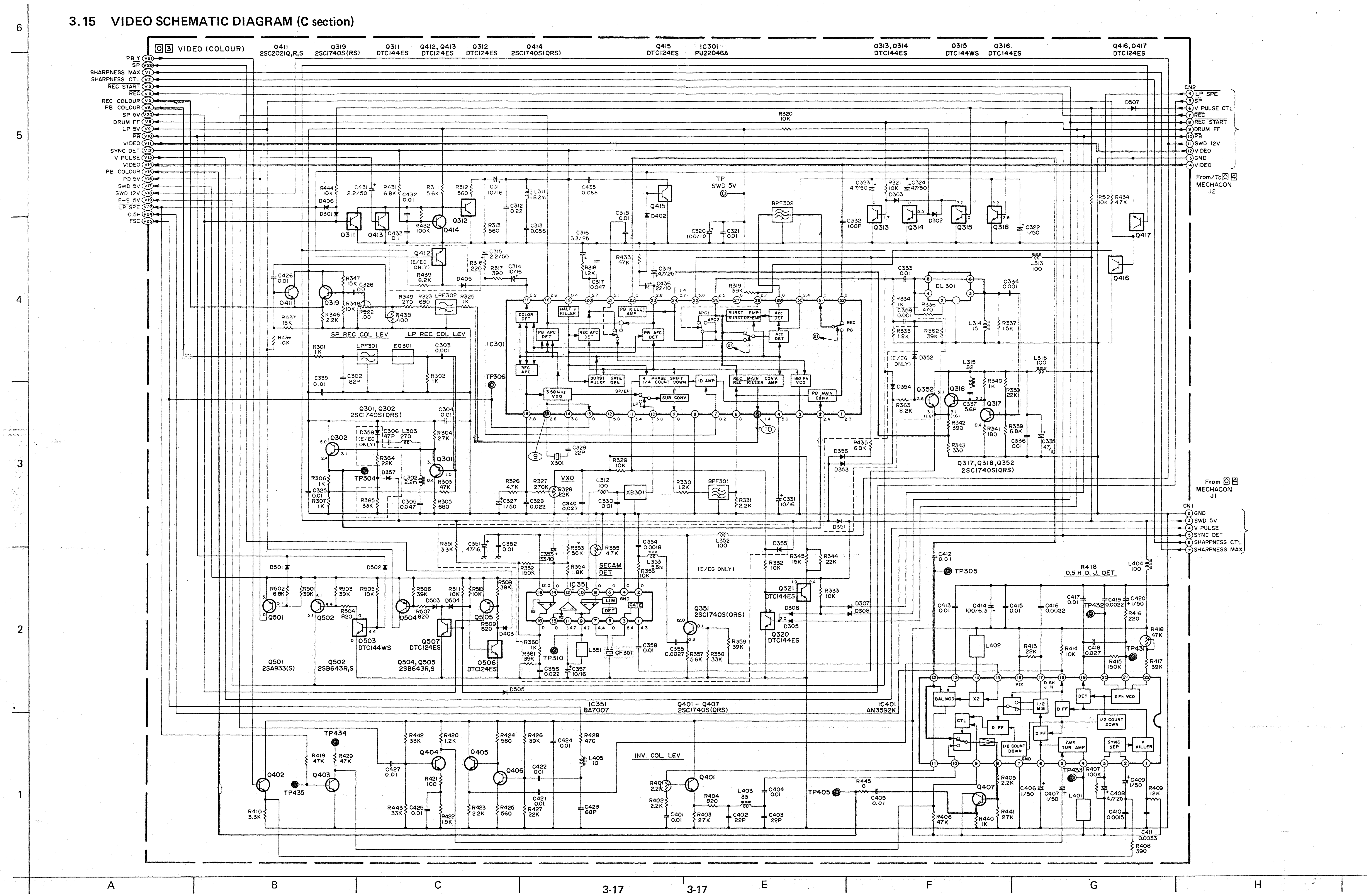

SERVO PWB
PU22283 -1 -1
PU22283 A-1 B-1 C-1
SERVO PWB ASS'Y
08
ELNA-437
94V-0
A
IC1
IC2
IC3
CN1
CN2
CN3
CN4
CN5
TP1
TP11
TP25
TP GND
X1
Q1
Q2
Q3
Q4
Q5
Q6
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
D15
D16
D17
R54
R46
R35
R53
R41
R37
R33
R30
R25
R49
R36
R13
R76
B1
B17
B14
B18
B19
B20
B21
B22
B23
B24
B25
B26
B28
B46
B47
B48
NP

3.14 VIDEO SCHEMATIC DIAGRAM (Y section)



03 VIDEO (LUMINANCE)
CN101
REC START 1
PB FM 2
REC FM/COL 3
GND 4
GND 5
PB COLOUR 6
NC 7
DRUM F F 8
LP 5V 9
NC 10
NC 11
REC 12
From / To 43 PRE/REC AMP CN1
TP GND 1
Q201 – Q203 DTC124ES
LP RF EQ
SP RF EQ
Q101,Q102,Q104,Q105 2SC1740S(QRS)
REC FM LEVEL
Q204 DTC124ES
IC101 PU22282A
IC102 7VT12
REC ON, PB OFF
DE-EMPHASIS
Q106,Q111 2SC1740S(QRS)
D103,D104 0A90
Q112,Q113 2SA1309R,S
TP106
TP121
TP110
TP GND 2
IC201 TA7374P
IC202 MSM6989RS
0.5H D. VIDEO LEV.
IC203 BA7021
TP221
TP222
EQ201
Q208,Q209,Q210,Q212,Q213 2SC1740S(QRS)
Q211 2SA1309R,S
Q215 2SC1740S(QRS)
Q214,Q216 DTC124ES
V21 PB Y
V26 SP
V1 SHARPNESS MAX
V2 SHARPNESS CTL
V3 REC START
V4 REC
V5 REC COLOUR
V6 PB COLOUR
V20 SP 5V
V8 DRUM F F
V9 LP 5V
V10 PB
V11 VIDEO
V12 SYNC DET
V13 V. PULSE
V14 VIDEO
V15 PB COLOUR
V16 PB 5V
V17 SWD 5V
V18 SWD 12V
V19 E-E 5V
V23 LP SPE
V24 0.5H
V25 FSC
6
5
4
3
2
1
A
B
C
D
E
F
G
H

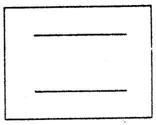
3.15 VIDEO SCHEMATIC DIAGRAM (C section)



03 VIDEO (COLOUR)
Q411 2SC2021Q,R,S
Q319 2SC1740S(RS)
Q311 DTC144ES
Q412, Q413 DTC124ES
Q312 DTC124ES
Q414 2SC1740S(QRS)
Q415 DTC124ES
IC301 PU22046A
Q313, Q314 DTC144ES
Q315 DTC144WS
Q316 DTC144ES
Q416, Q417 DTC124ES
PB Y V21
SP V26
SHARPNESS MAX V1
SHARPNESS CTL V2
REC START V3
REC V4
REC COLOUR V5
PB COLOUR V6
SP 5V V20
DRUM FF V8
LP 5V V9
PB V10
VIDEO V11
SYNC DET V12
V PULSE V13
VIDEO V14
PB COLOUR V15
PB 5V V16
SWD 5V V17
SWD 12V V18
E-E 5V V19
LP SPE V23
0.5H V24
FSC V25
CN2
LP SPE
SP
V PULSE CTL
REC
REC START
DRUM FF
PB
SWD 12V
VIDEO
GND
VIDEO
From/To 04 MECHACON J2
From 04 MECHACON J1
CN1
GND
SWD 5V
V PULSE
SYNC DET
SHARPNESS CTL
SHARPNESS MAX
TP SWD 5V
BPF302
BPF301
DL301
SP REC COL LEV
LP REC COL LEV
LPF301
LPF302
EQ301
IC301
COLOR DET
HALF H KILLER
PB KILLER AMP
PB APC DET
REC AFC DET
PB AFC DET
APC1
APC2
BURST EMP BURST DE-EMP
Acc DET
REC APC
BURST GATE PULSE GEN
4 PHASE SHIFT 1/4 COUNT DOWN
ID AMP
REC MAIN CONV. REC KILLER AMP
160 Fh VCO
3.58MHz VXO
SUB CONV.
PB MAIN CONV.
SP/EP
REC
PB
(E/EG ONLY)
Q301, Q302 2SC1740S(QRS)
Q317, Q318, Q352 2SC1740S(QRS)
X301
VXO
XB301
TP306
TP304
TP305
TP310
SECAM DET
IC351 BA7007
LIM
DET
GATE
CF351
L351
Q351 2SC1740S(QRS)
Q321 DTC144ES
Q320 DTC144ES
Q501 2SA933(S)
Q502 2SB643R,S
Q503 DTC144WS
Q504, Q505 2SB643R,S
Q507 DTC124ES
Q506 DTC124ES
D505
Q401 – Q407 2SC1740S(QRS)
IC401 AN3592K
R418 0.5H D.J. DET
INV. COL. LEV
TP434
TP435
TP405
TP431
TP432
TP433
BAL MOD
X2
1/2 MM
D FF
CTL
1/2 COUNT DOWN
DET
2 Fh VCO
7.8K TUN AMP
SYNC SEP
V KILLER
Vcc
GND
D SH J H
L402
L401
L404
Q402
Q403
Q404
Q405
Q406
Q407
Q401
A
B
C
E
F
G
H
1
2
3
4
5
6

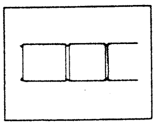
– Waveforms of video circuit –

1



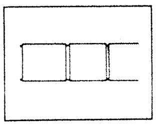
CN101, 3
REC FM
0.05 Vp-p

2



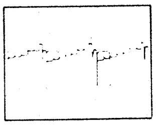
CN101, 2
PB FM
PB 0.4 Vp-p

3



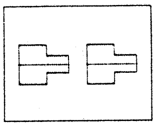
IC101-22
PB FM
0.3 Vp-p

4



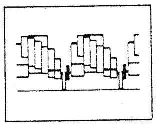
IC101-16
PB 0.3 Vp-p

5



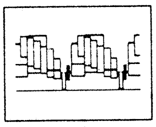
IC101-10
PB 0.4 Vp-p

6



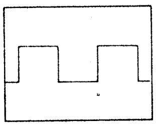
IC101-7
REC/PB
0.5 Vp-p

7



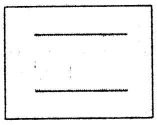
IC101-5
PB 0.2 Vp-p

8



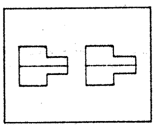
CN101-8
DRUM FF
4.4 Vp-p

9



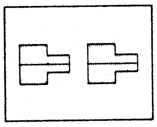
IC301, 15
VXO
0.5 Vp-p

10



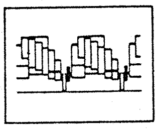
IC301, 5
PB 0.4 Vp-p

11



CN101, 6
PB COLOUR
PB 0.25 Vp-p

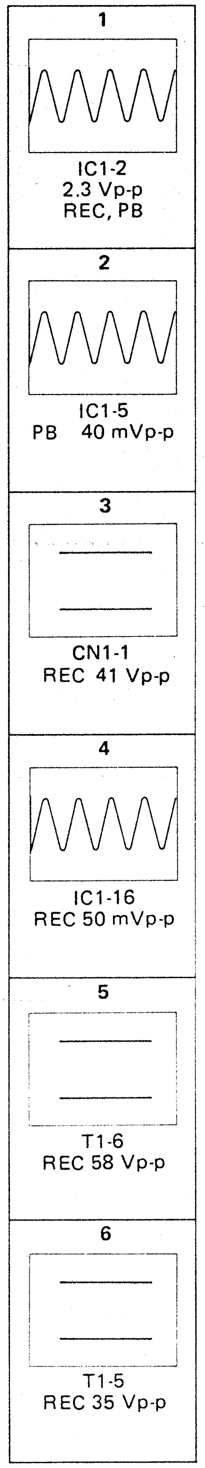
12

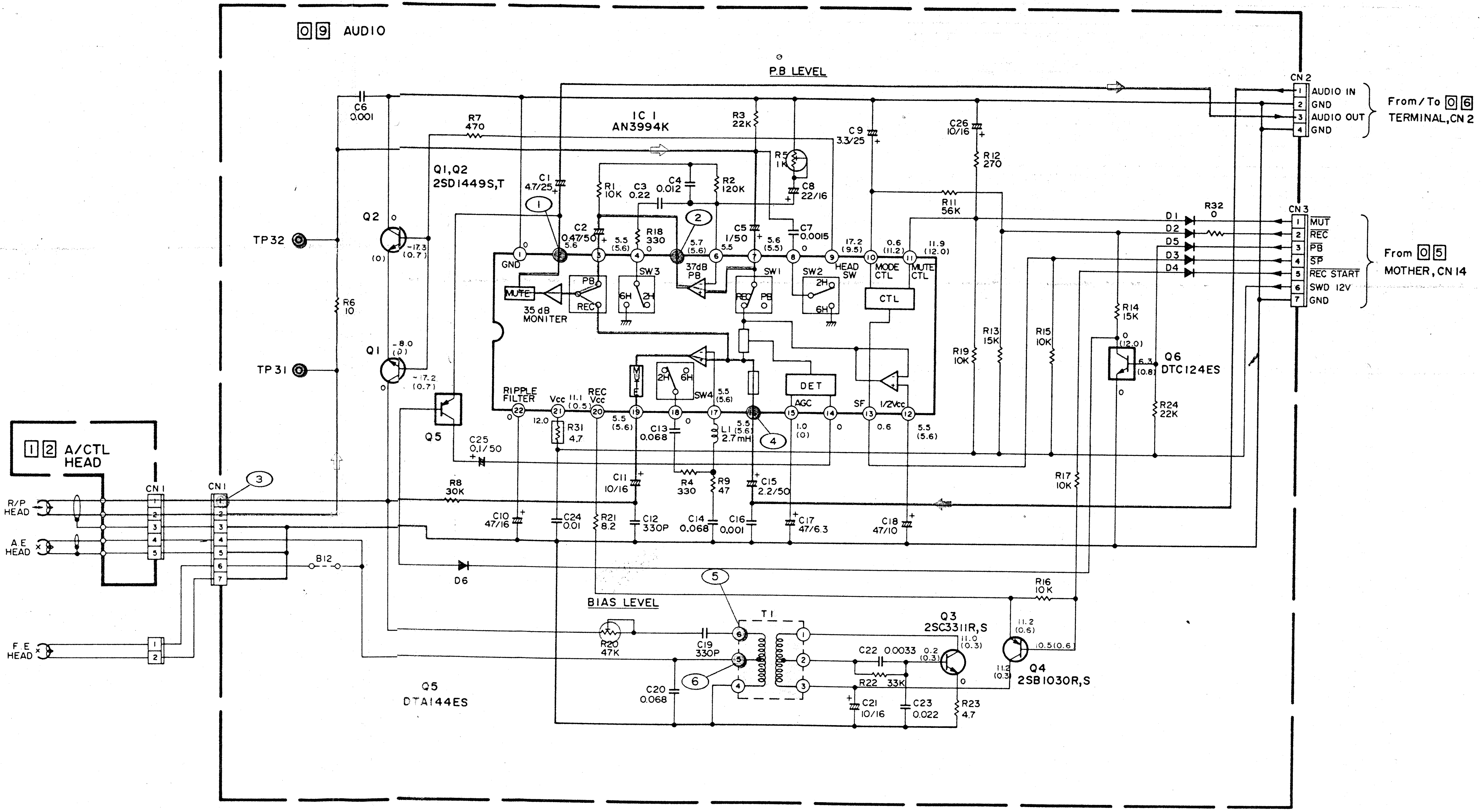


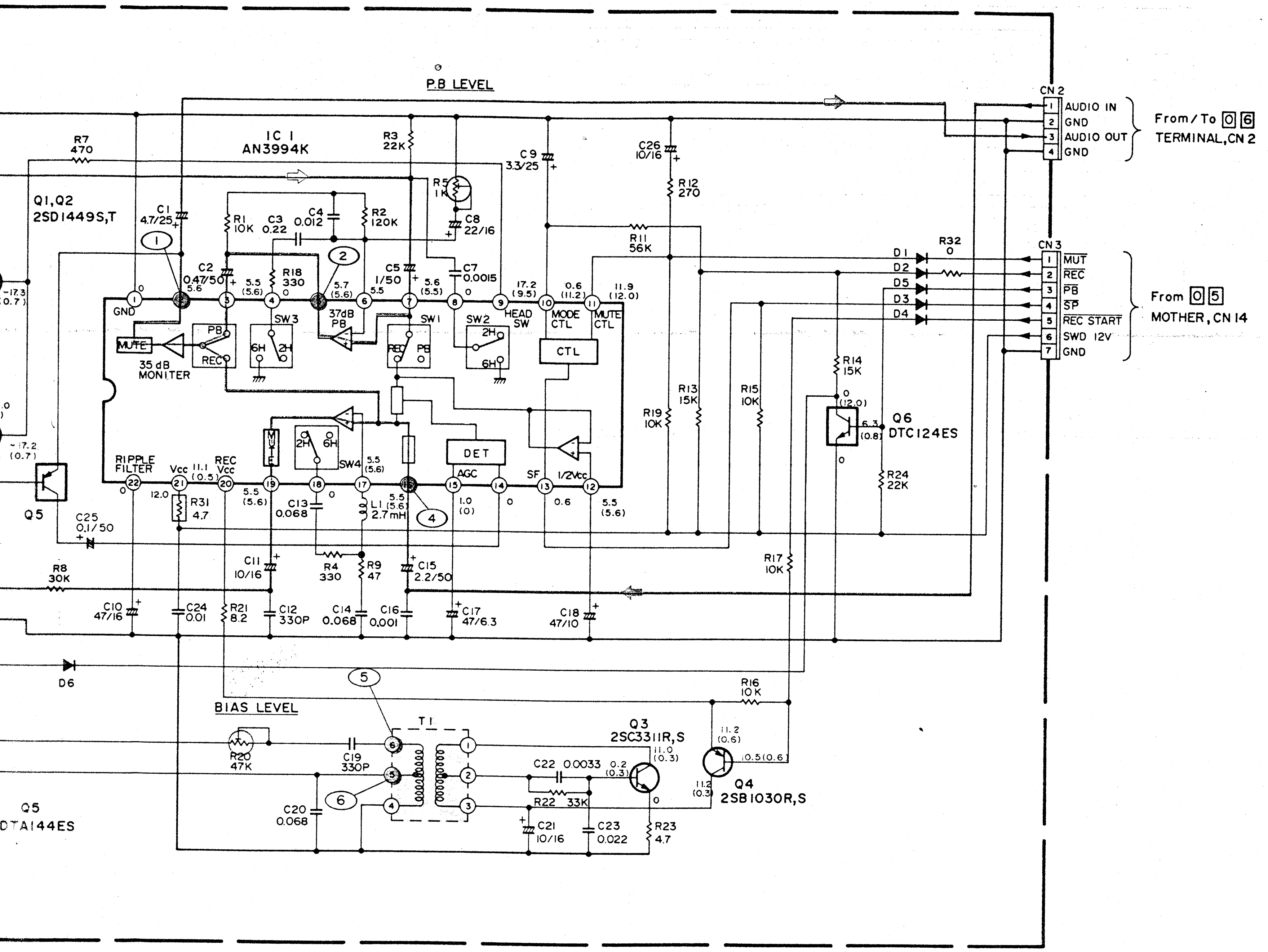
TP110
VIDEO OUT
1.8 Vp-p

3.16 AUDIO SCHEMATIC DIAGRAM

— Waveforms of audio circuit —

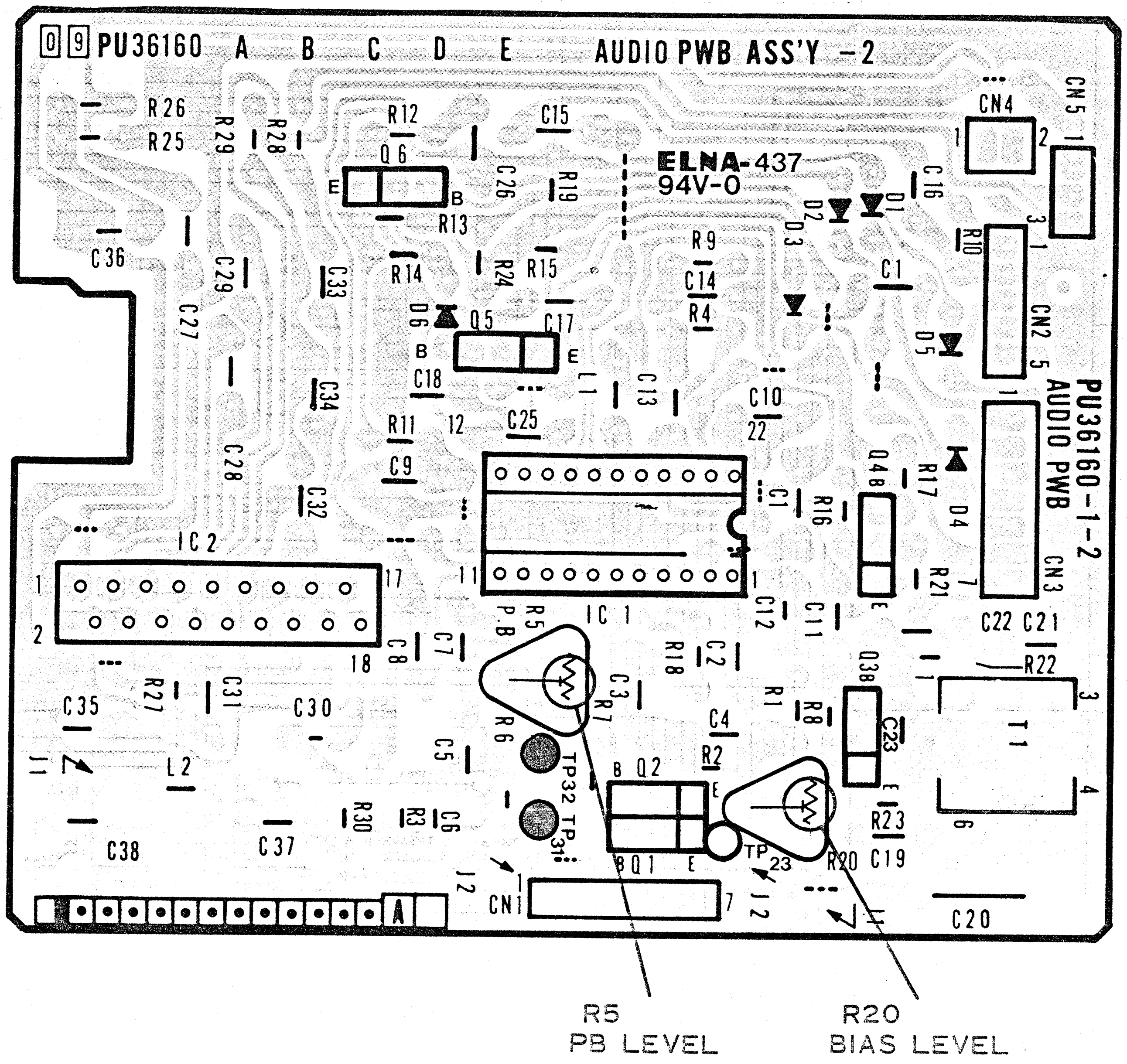



0 9 AUDIO
P.B LEVEL
C6
0.001
R7
470
IC 1
AN3994K
R3
22K
C9
3.3/25
C26
10/16
R12
270
R5
1K
C8
22/16
Q1,Q2
2SD1449S,T
C1
4.7/25
R1
10K
C3
0.22
C4
0.012
R2
120K
R11
56K
Q2
TP32
Q1
TP31
-17.3
(0.7)
(0)
-8.0
(0)
-17.2
(0.7)
R6
10
C2
0.47/50
R18
330
C5
1/50
C7
0.0015
GND
MUTE
35 dB
MONITER
PB
REC
SW3
6H
2H
37dB
PB
SW1
SW2
HEAD SW
MODE CTL
MUTE CTL
CTL
17.2
(9.5)
0.6
(11.2)
11.9
(12.0)
5.6
5.5
(5.6)
5.7
(5.6)
5.5
5.6
(5.5)
RIPPLE FILTER
Vcc
11.1
(0.5)
REC Vcc
SW4
DET
AGC
SF
1/2Vcc
12.0
R31
4.7
C13
0.068
L1
2.7mH
1.0
(0)
0.6
5.5
(5.6)
Q5
C25
0.1/50
R8
30K
C11
10/16
R4
330
R9
47
C15
2.2/50
C10
47/16
C24
0.01
R21
8.2
C12
330P
C14
0.068
C16
0.001
C17
47/6.3
C18
47/10
R17
10K
R19
10K
R13
15K
R15
10K
R14
15K
Q6
DTC124ES
6.3
(0.8)
(12.0)
R24
22K
D1
D2
D5
D3
D4
R32
0
CN 2
AUDIO IN
GND
AUDIO OUT
GND
From/To 0 6
TERMINAL, CN 2
CN 3
MUT
REC
PB
SP
REC START
SWD 12V
GND
From 0 5
MOTHER, CN 14
1 2 A/CTL
HEAD
R/P
HEAD
A.E
HEAD
F.E
HEAD
CN 1
CN 1
B12
D6
R16
10K
BIAS LEVEL
T1
R20
47K
C19
330P
C20
0.068
Q3
2SC3311R,S
11.0
(0.3)
0.2
(0.3)
C22 0.0033
R22 33K
C21
10/16
C23
0.022
R23
4.7
Q4
2SB1030R,S
11.2
(0.6)
10.5 (0.6)
11.2
(0.3)
Q5
DTA144ES
①
②
③
④
⑤
⑥

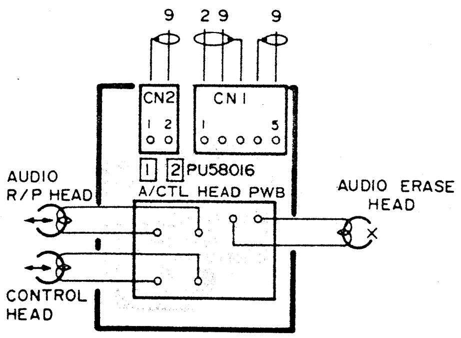

P.B LEVEL
IC 1
AN3994K
Q1,Q2
2SD1449S,T
R7 470
R3 22K
R5 1K
C8 22/16
C9 3.3/25
C26 10/16
R12 270
R11 56K
R32 0
CN 2
AUDIO IN
GND
AUDIO OUT
GND
From/To 06
TERMINAL,CN 2
CN 3
MUT
REC
PB
SP
REC START
SWD 12V
GND
From 05
MOTHER, CN 14
D1
D2
D5
D3
D4
GND
MUTE
35 dB
MONITER
SW3
37dB
PB
SW1
SW2
HEAD SW
MODE CTL
MUTE CTL
CTL
DET
AGC
SF
1/2Vcc
RIPPLE FILTER
Vcc
REC Vcc
SW4
L1 2.7mH
R14 15K
Q6
DTC124ES
R24 22K
R13 15K
R15 10K
R19 10K
R17 10K
R16 10K
Q5
DTA144ES
C25 0.1/50
R8 30K
C10 47/16
C24 0.01
R21 8.2
C12 330P
C14 0.068
C16 0.001
C17 47/6.3
C18 47/10
C11 10/16
R4 330
R9 47
C15 2.2/50
R31 4.7
C13 0.068
D6
BIAS LEVEL
R20 47K
C19 330P
C20 0.068
T1
C22 0.0033
R22 33K
C21 10/16
C23 0.022
R23 4.7
Q3
2SC3311R,S
Q4
2SB1030R,S

3.17 AUDIO AND A/CTL HEAD CIRCUIT BOARDS

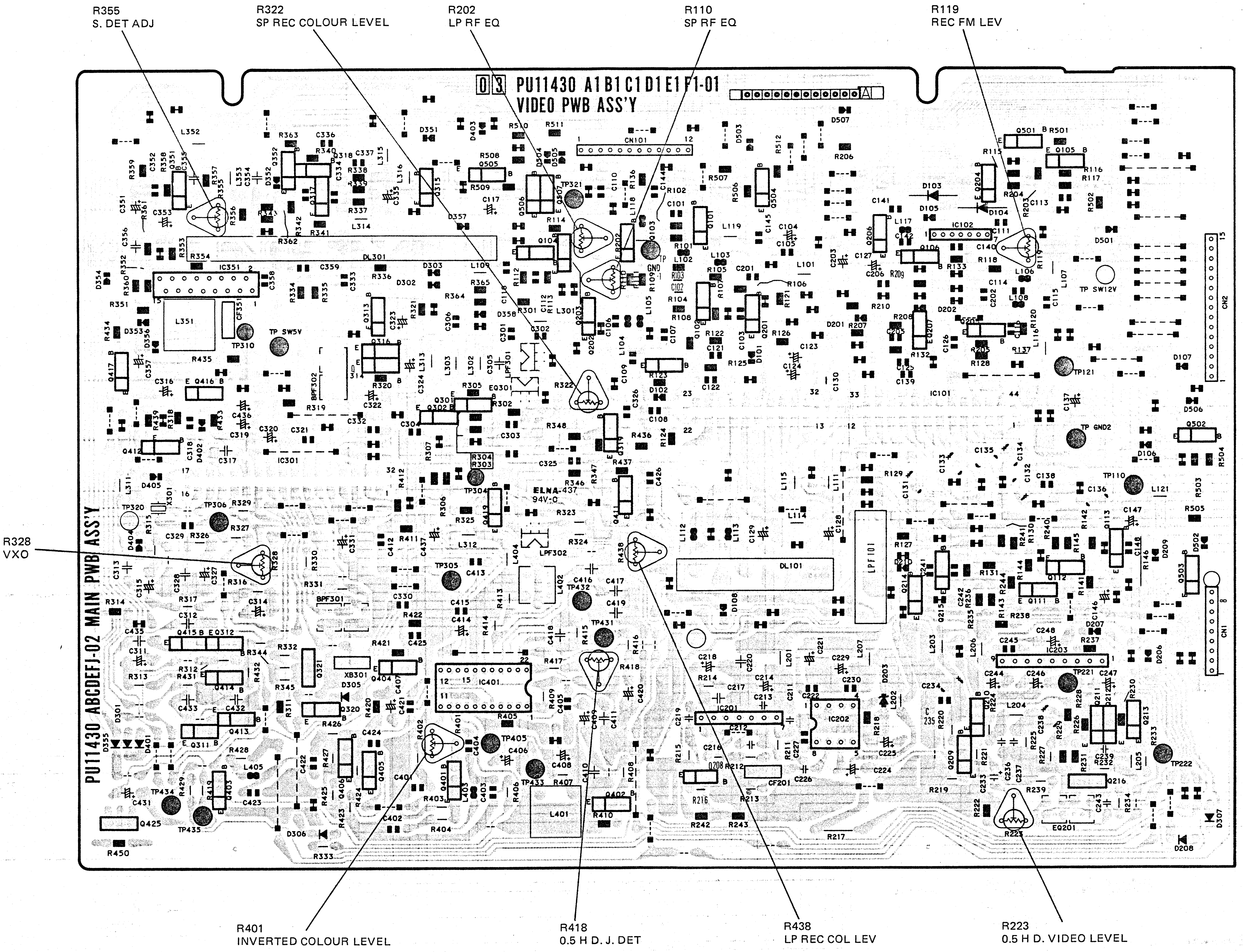
— AUDIO —


09 PU36160
AUDIO PWB ASS'Y -2
ELNA-437
94V-0
PU36160-1-2
AUDIO PWB
IC 1
IC 2
CN 1
CN 2
CN 3
CN 4
CN 5
TP32
TP31
TP23
R5
PB LEVEL
R20
BIAS LEVEL

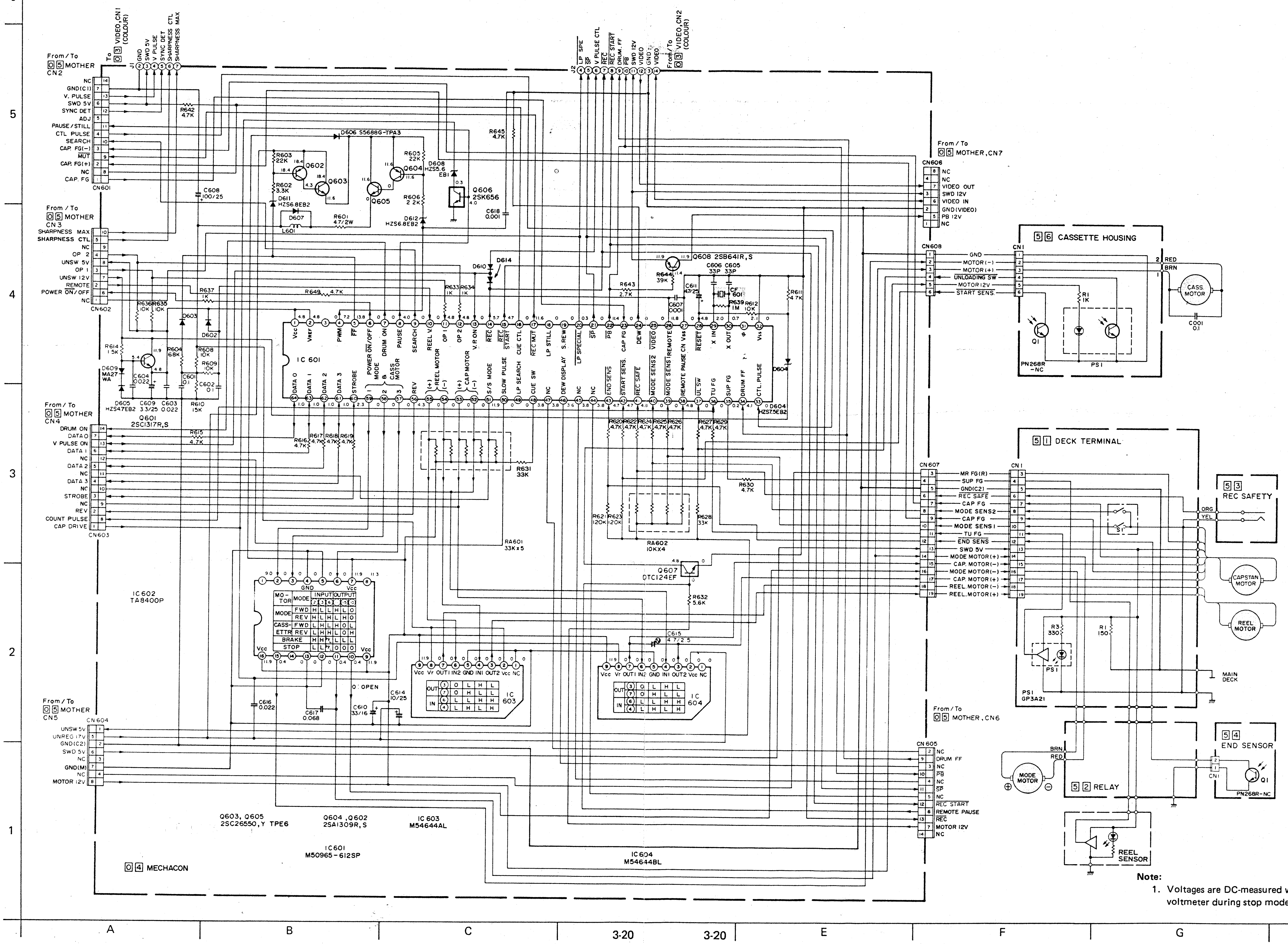
— A/CTL HEAD —


CN2
CN1
1 2 PU58016
A/CTL HEAD PWB
AUDIO R/P HEAD
AUDIO ERASE HEAD
CONTROL HEAD

3.18 VIDEO CIRCUIT BOARD


R355
S. DET ADJ
R322
SP REC COLOUR LEVEL
R202
LP RF EQ
R110
SP RF EQ
R119
REC FM LEV
R328
VXO
R401
INVERTED COLOUR LEVEL
R418
0.5 H D. J. DET
R438
LP REC COL LEV
R223
0.5 H D. VIDEO LEVEL
03 PU11430 A1B1C1D1E1F1-01
VIDEO PWB ASS'Y
PU11430 ABCDEFJ-02 MAIN PWB ASS'Y
ELNA-437
94V-0
6
5
4
3
2
1
A
B
C
E
F
G
H

3.19 MECHANISM CONTROL SCHEMATIC DIAGRAM

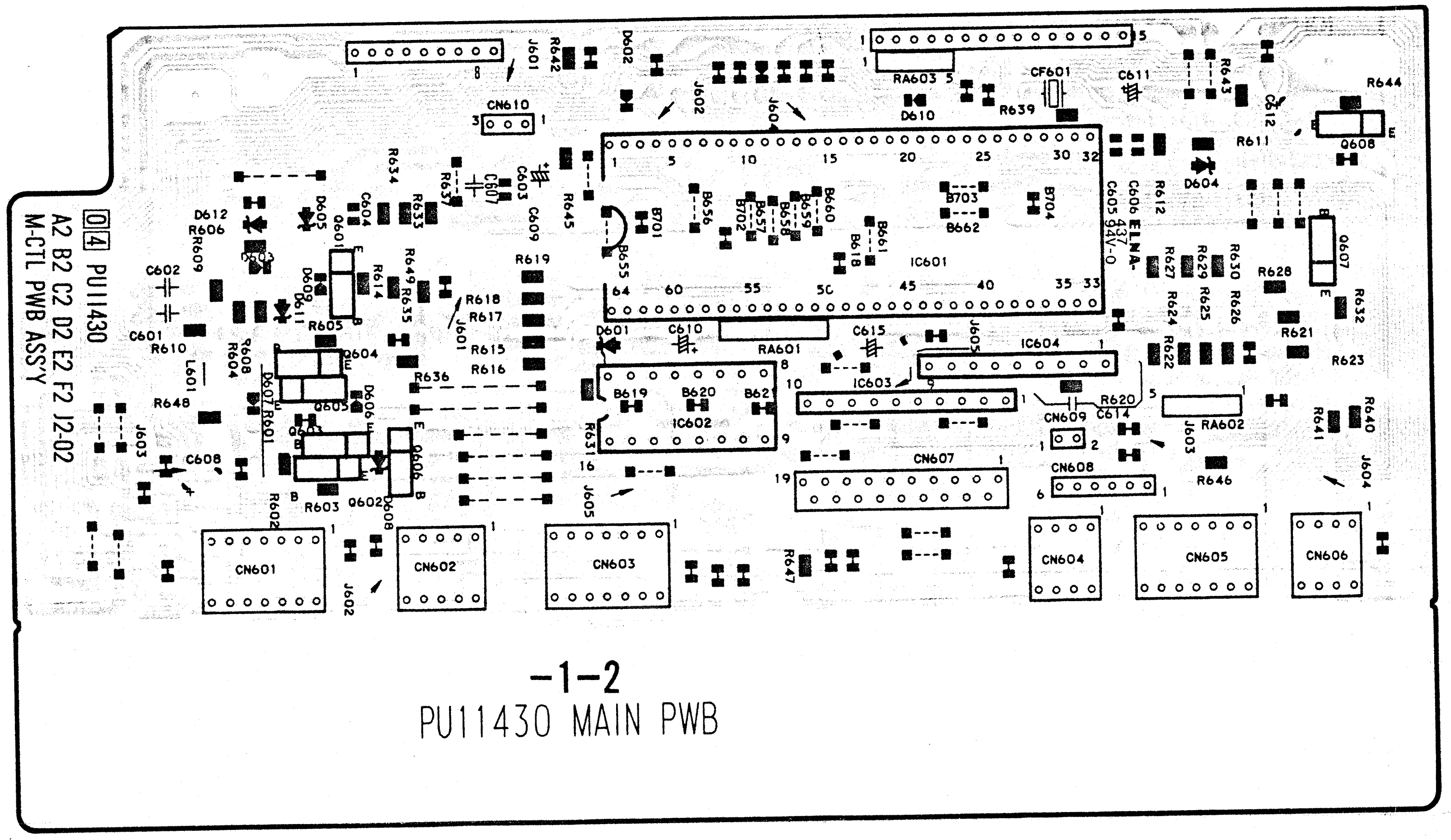


From/To 05 MOTHER CN2
CN601
From/To 05 MOTHER CN3
CN602
From/To 05 MOTHER CN4
CN603
From/To 05 MOTHER CN5
CN604
To 03 VIDEO, CN1 (COLOUR)
From/To 03 VIDEO, CN2 (COLOUR)
From/To 05 MOTHER, CN7
CN606
CN608
From/To 05 MOTHER, CN6
CN605
CN607
IC 601
IC602 TA8400P
IC 603
IC 604
D606 S5688G-TPA3
Q602
Q603
Q604
Q605
Q606 2SK656
Q607 DTC124EF
Q608 2SB641R,S
Q601 2SC1317R,S
RA601 33K×5
RA602 10K×4
56 CASSETTE HOUSING
CASS. MOTOR
PN268R-NC
51 DECK TERMINAL
53 REC SAFETY
CAPSTAN MOTOR
REEL MOTOR
MAIN DECK
PS1 GP3A21
54 END SENSOR
PN268R-NC
MODE MOTOR
52 RELAY
REEL SENSOR
Q603, Q605 2SC2655O,Y TPE6
Q604, Q602 2SA1309R,S
IC 603 M54644AL
IC601 M50965-612SP
IC 604 M54644BL
04 MECHACON
A
B
C
D
E
F
G
H
1
2
3
4
5
6

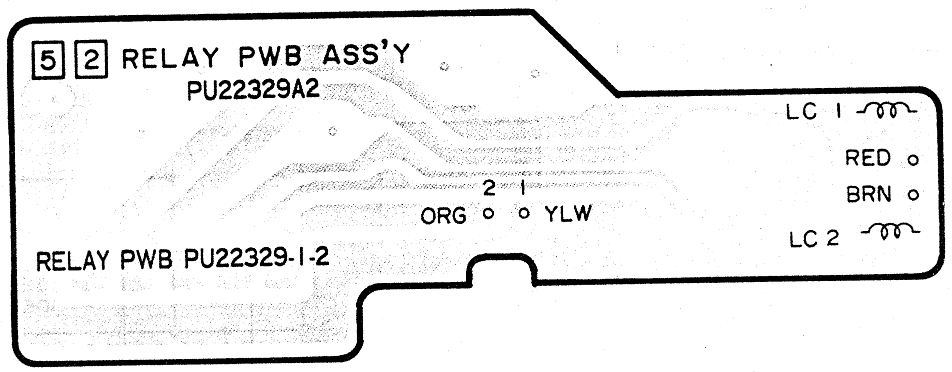
Note:
1. Voltages are DC-measured with a digital voltmeter during stop mode.

3.20 MECHANISM CONTROL CIRCUIT BOARD

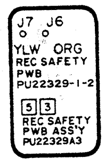
– MECHACON –


0 4 PU11430
A2 B2 C2 D2 E2 F2 J2-02
M-CTL PWB ASS'Y
-1-2
PU11430 MAIN PWB
IC601
IC602
IC603
IC604
CN601
CN602
CN603
CN604
CN605
CN606
CN607
CN608
CN609
CN610
CF601
RA601
RA602
RA603
Q601
Q602
Q603
Q604
Q605
Q606
Q607
Q608
ELNA

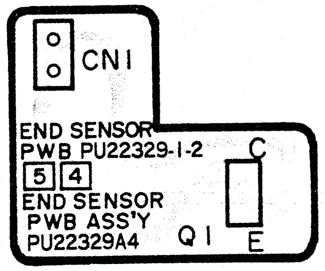
– RELAY –


5 2 RELAY PWB ASS'Y
PU22329A2
LC 1
RED
BRN
2 1
ORG YLW
LC 2
RELAY PWB PU22329-1-2

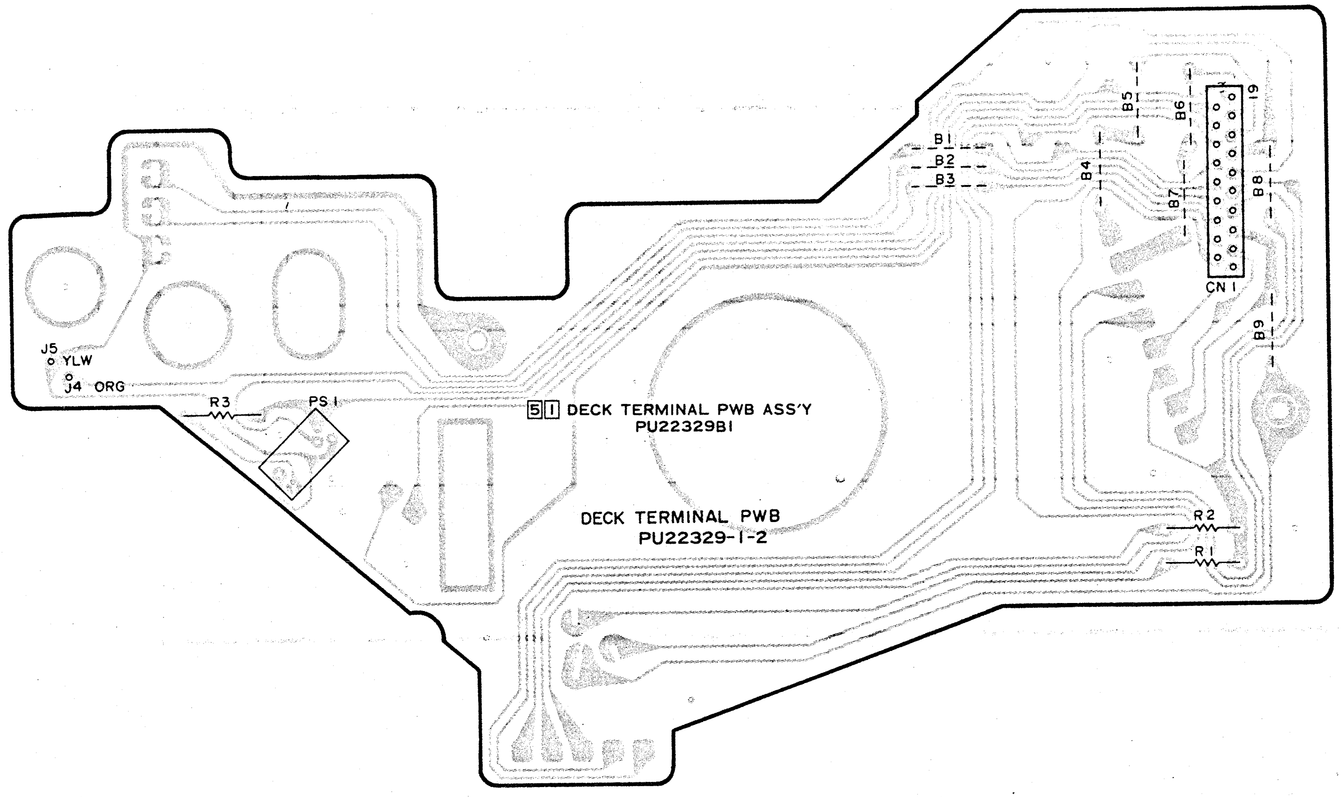
– REC SEFETY –


J7 J6
YLW ORG
REC SAFETY PWB
PU22329-1-2
5 3
REC SAFETY PWB ASS'Y
PU22329A3

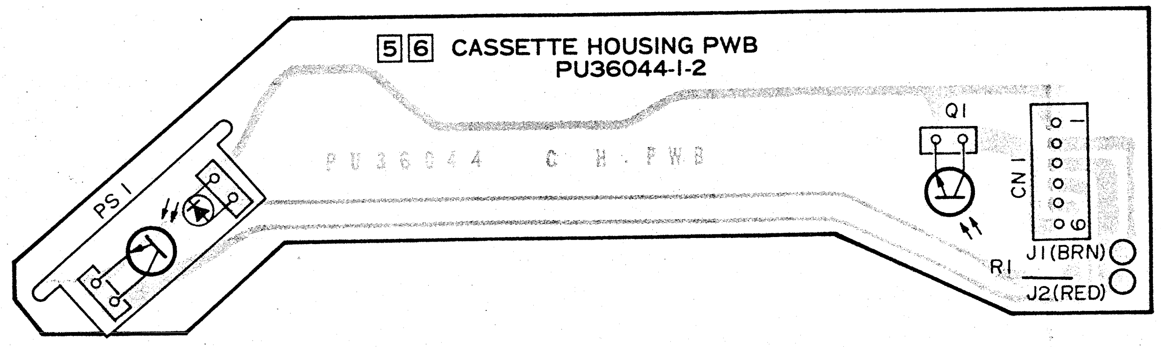
– END SENSOR –


CN1
END SENSOR PWB PU22329-1-2
5 4
END SENSOR PWB ASS'Y
PU22329A4
C
Q1
E

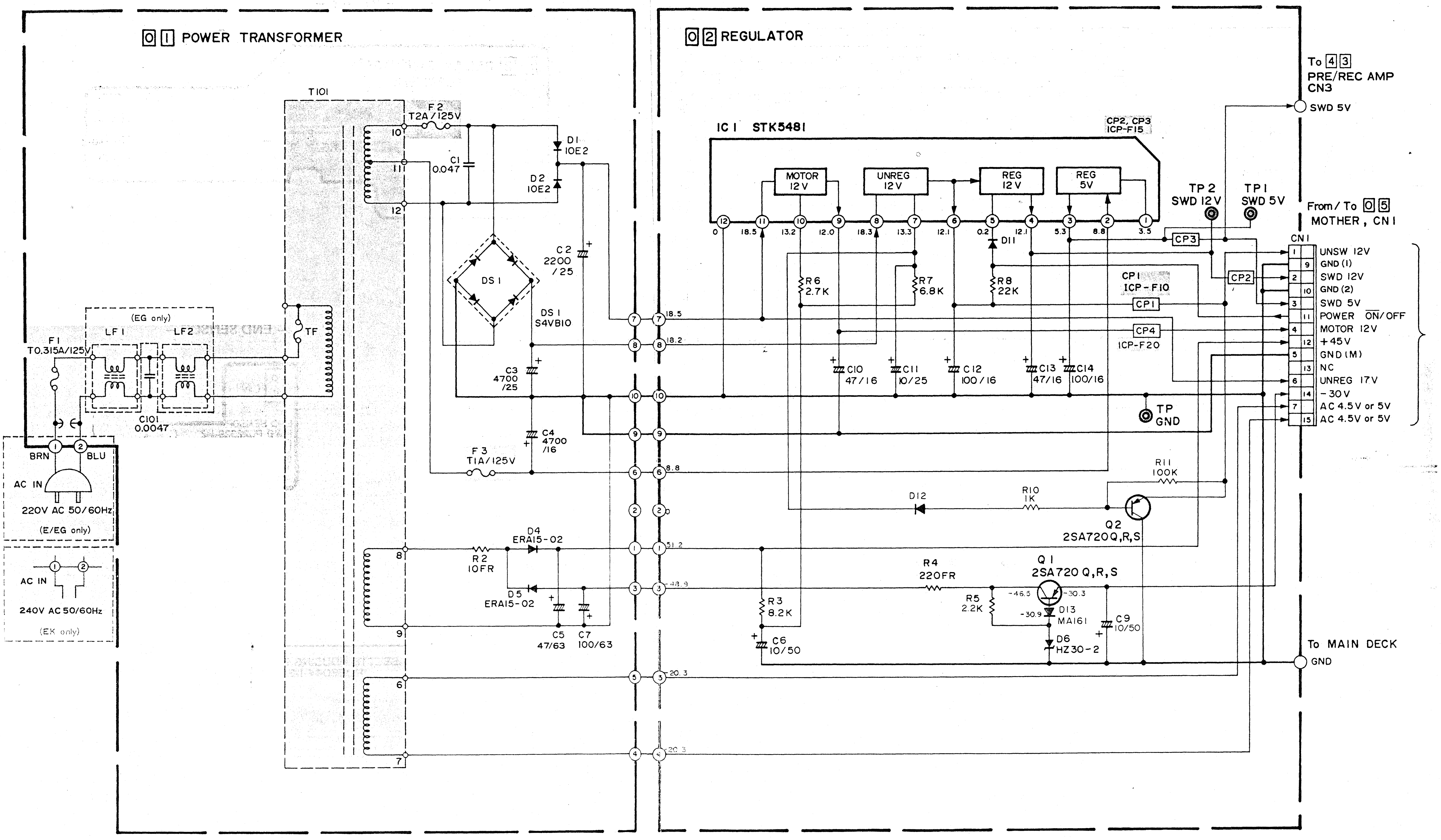
– DECK TERMINAL –


J5 YLW
J4 ORG
R3
PS1
5 1 DECK TERMINAL PWB ASS'Y
PU22329B1
DECK TERMINAL PWB
PU22329-1-2
B1
B2
B3
B4
B5
B6
B7
B8
B9
CN1
R2
R1

– CASSETTE HOUSING –


5 6 CASSETTE HOUSING PWB
PU36044-1-2
PU36044 C.H.PWB
PS1
Q1
CN1
R1
J1(BRN)
J2(RED)

3.21 POWER SUPPLY SCHEMATIC DIAGRAM

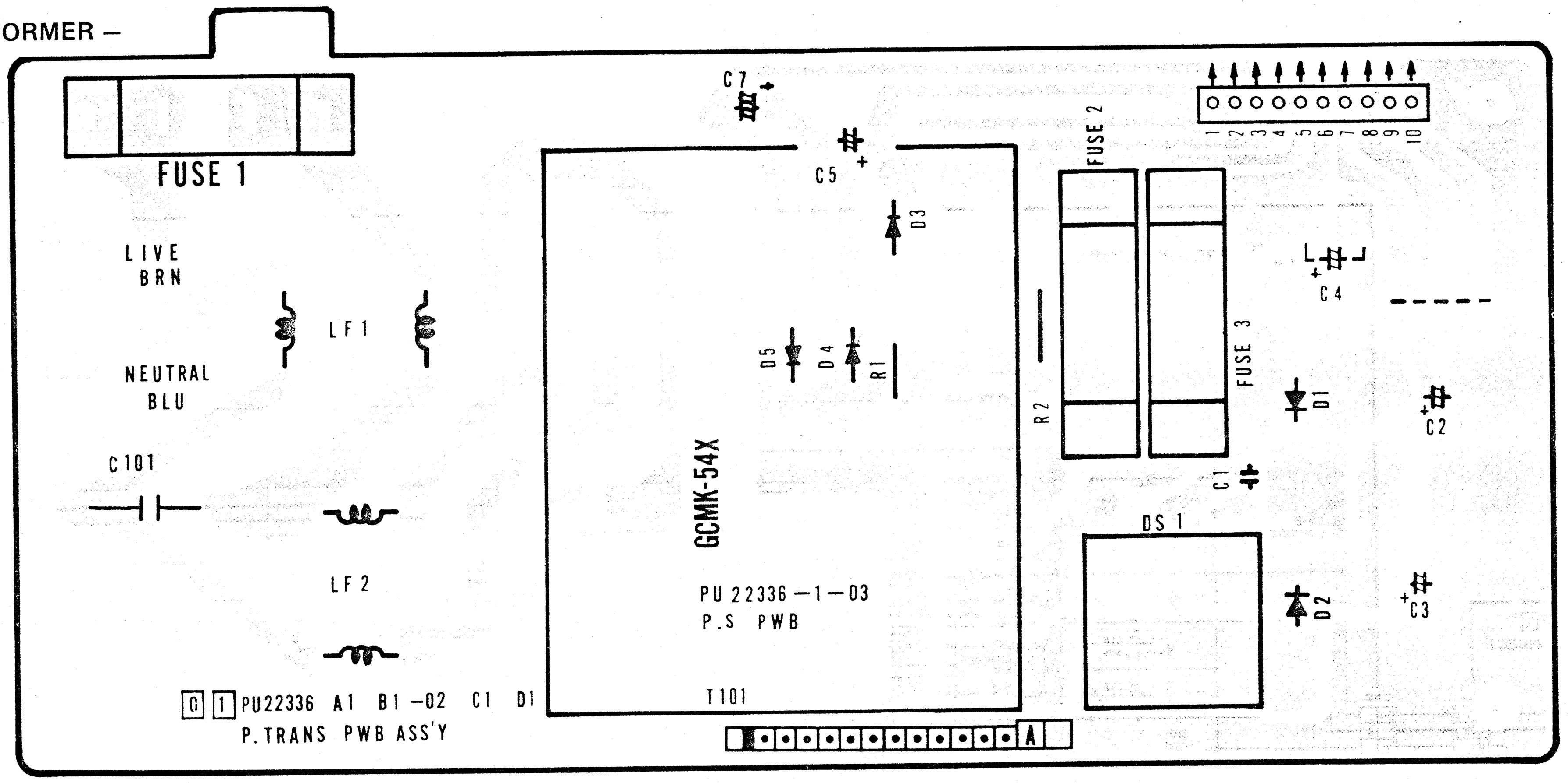

01 POWER TRANSFORMER
02 REGULATOR
T101
F2
T2A/125V
D1
10E2
D2
10E2
C1
0.047
C2
2200
/25
DS1
DS1
S4VB10
C3
4700
/25
C4
4700
/16
F3
T1A/125V
TF
(EG only)
LF1
LF2
F1
T0.315A/125V
C101
0.0047
BRN
BLU
AC IN
220V AC 50/60Hz
(E/EG only)
AC IN
240V AC 50/60Hz
(EK only)
D4
ERA15-02
R2
10FR
D5
ERA15-02
C5
47/63
C7
100/63
IC1 STK5481
MOTOR
12V
UNREG
12V
REG
12V
REG
5V
CP2, CP3
ICP-F15
TP2
SWD 12V
TP1
SWD 5V
CP3
CP2
CP1
ICP-F10
CP1
CP4
ICP-F20
R6
2.7K
R7
6.8K
R8
22K
D11
C10
47/16
C11
10/25
C12
100/16
C13
47/16
C14
100/16
TP
GND
R11
100K
D12
R10
1K
Q2
2SA720Q,R,S
Q1
2SA720 Q,R,S
R4
220FR
R5
2.2K
D13
MA161
D6
HZ30-2
C9
10/50
R3
8.2K
C6
10/50
18.5
18.2
8.8
51.2
-48.9
-20.3
-20.3
-46.5
-30.3
-30.9
To 43
PRE/REC AMP
CN3
SWD 5V
From/To 05
MOTHER, CN1
CN1
UNSW 12V
GND (1)
SWD 12V
GND (2)
SWD 5V
POWER ON/OFF
MOTOR 12V
+45V
GND (M)
NC
UNREG 17V
-30V
AC 4.5V or 5V
AC 4.5V or 5V
To MAIN DECK
GND
6
5
4
3
2
1
A
B
C
E
F
G
H

Note:

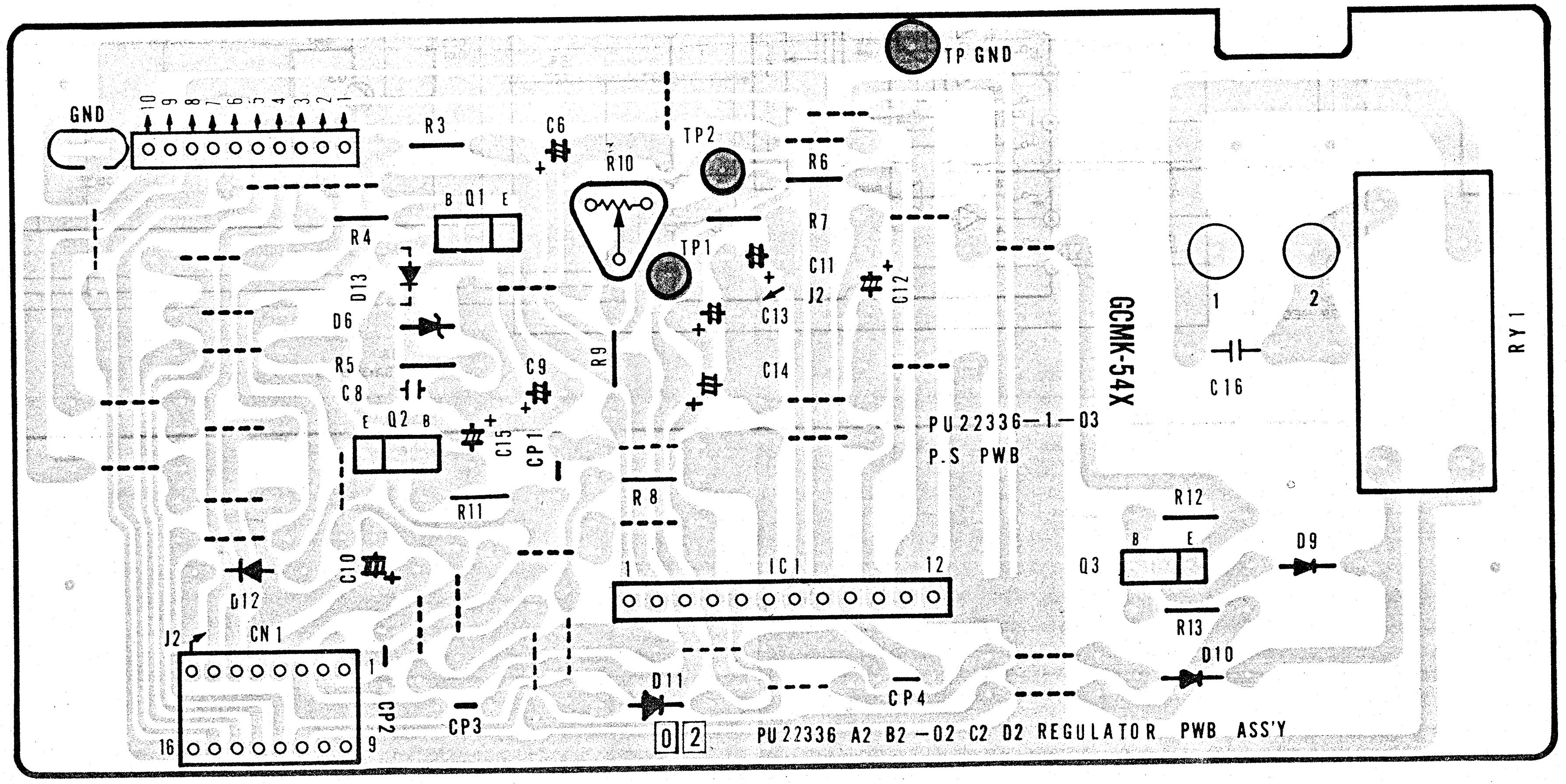
1. Voltages are DC-measured with a digital voltmeter during stop mode.

3.22 POWER SUPPLY CIRCUIT BOARD

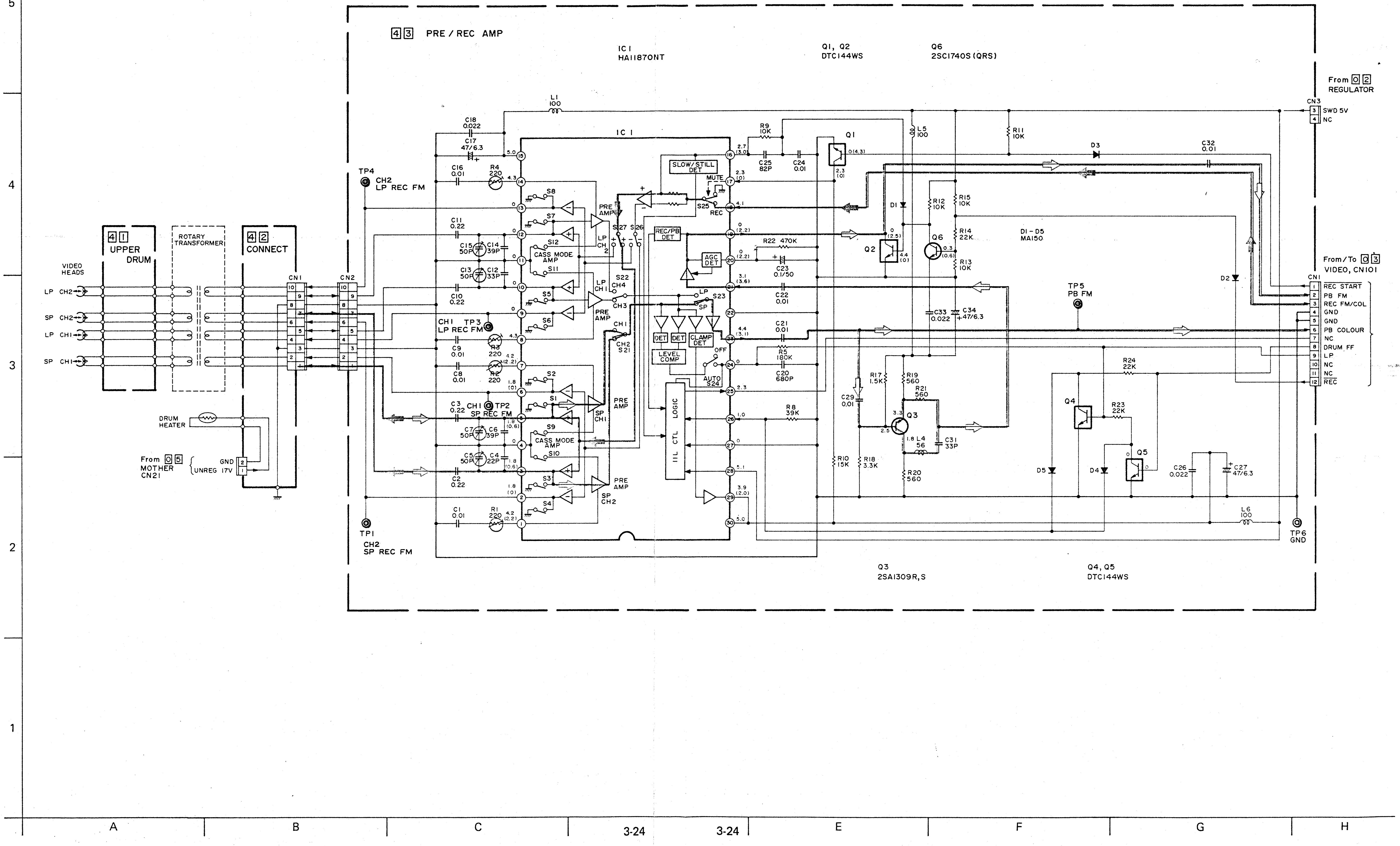
– POWER TRANSFORMER –


FUSE 1
LIVE
BRN
NEUTRAL
BLU
LF 1
C101
LF 2
C7
C5
D3
D5
D4
R1
GCMK-54X
PU 22336 – 1 – 03
P.S PWB
T101
FUSE 2
FUSE 3
R2
1 2 3 4 5 6 7 8 9 10
C4
D1
C2
C1
DS 1
D2
C3
A
0 1 PU22336 A1 B1 –02 C1 D1
P.TRANS PWB ASS'Y

– REGULATOR –

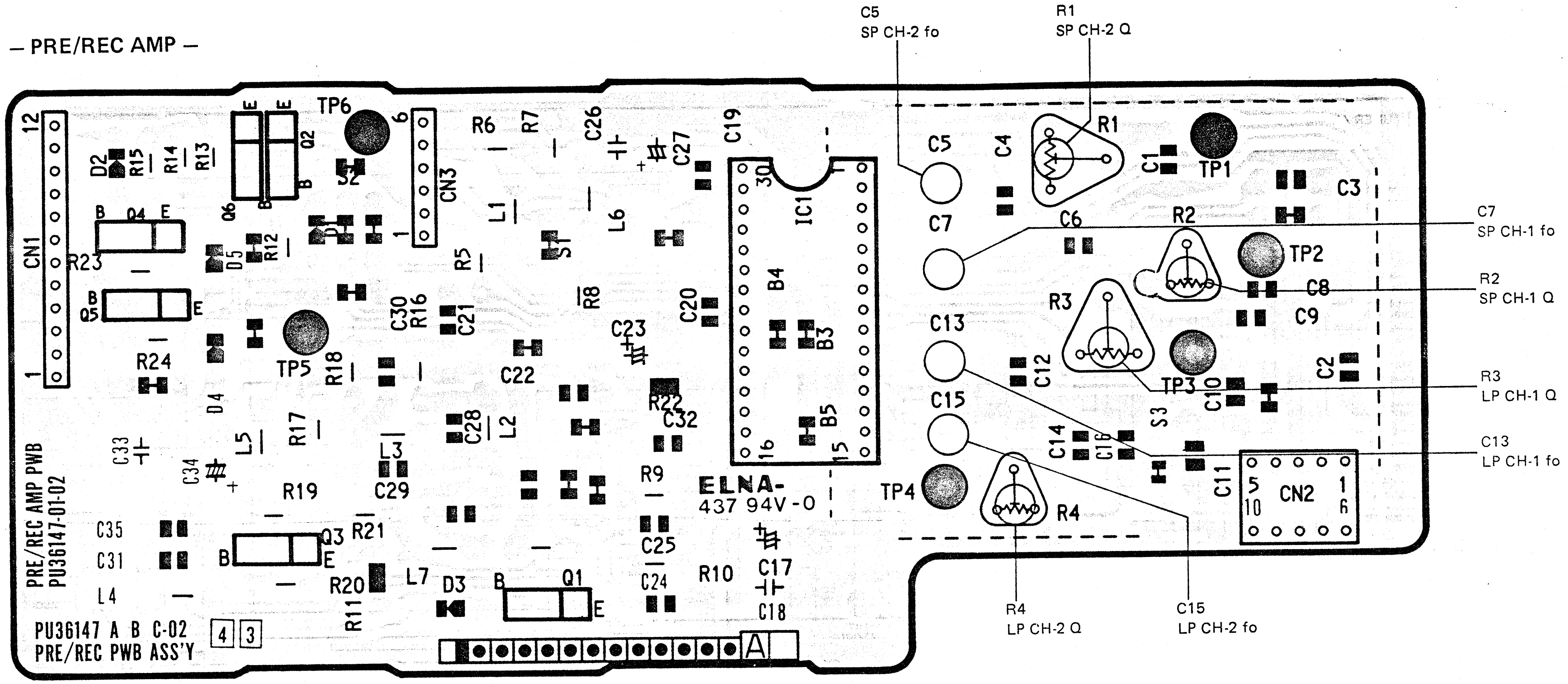

GND
10 9 8 7 6 5 4 3 2 1
R3
C6
R10
TP2
TP GND
R6
R7
B Q1 E
R4
TP1
C11
J2
C12
C13
C14
D13
D6
R5
C8
C9
R9
E Q2 B
C15
CP1
R11
R8
C10
D12
J2
CN1
1
16
9
CP2
CP3
D11
IC1
1
12
CP4
0 2 PU22336 A2 B2 –02 C2 D2 REGULATOR PWB ASS'Y
GCMK-54X
PU22336–1–03
P.S PWB
1
2
C16
RY1
R12
B E
Q3
D9
R13
D10

3.23 PRE/REC AMP SCHEMATIC DIAGRAM

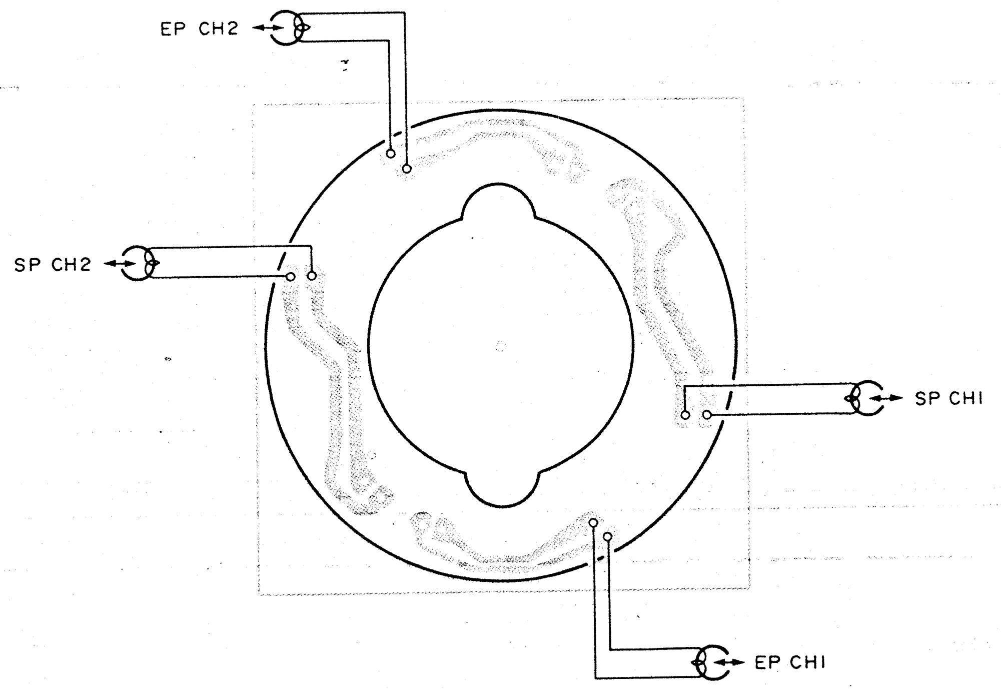

4 3 PRE / REC AMP
IC1 HA11870NT
Q1, Q2 DTC144WS
Q6 2SC1740S (QRS)
Q3 2SA1309R,S
Q4, Q5 DTC144WS
D1 - D5 MA150
From 0 2 REGULATOR
CN3
SWD 5V
NC
From/To 0 3 VIDEO, CN101
CN1
REC START
PB FM
REC FM/COL
GND
GND
PB COLOUR
NC
DRUM FF
LP
NC
NC
REC
VIDEO HEADS
LP CH2
SP CH2
LP CH1
SP CH1
4 1 UPPER DRUM
ROTARY TRANSFORMER
4 2 CONNECT
CN1
CN2
DRUM HEATER
From 0 5 MOTHER CN21
GND
UNREG 17V
TP4 CH2 LP REC FM
TP3 CH1 LP REC FM
TP2 CH1 SP REC FM
TP1 CH2 SP REC FM
TP5 PB FM
TP6 GND
L1 100
C18 0.022
C17 47/6.3
C16 0.01
R4 220
C11 0.22
C15 50P
C14 39P
C13 50P
C12 33P
C10 0.22
C9 0.01
R3 220
C8 0.01
R2 220
C3 0.22
C7 50P
C6 39P
C5 50P
C4 22P
C2 0.22
C1 0.01
R1 220
IC1
S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12
CASS MODE AMP
PRE AMP
LP CH2
LP CH1
SP CH1
SP CH2
S22 CH4 CH3
S21 CH1 CH2
S23 LP SP
S25 REC
S26 S27
MUTE
SLOW/STILL DET
REC/PB DET
AGC DET
DET DET CLAMP DET
LEVEL COMP
OFF AUTO S24
IIL CTL LOGIC
R9 10K
C25 82P
C24 0.01
R22 470K
C23 0.1/50
C22 0.01
C21 0.01
R5 180K
C20 680P
R8 39K
Q1
Q2
Q6
L5 100
D1
R12 10K
R15 10K
R14 22K
R13 10K
R11 10K
C33 0.022
C34 47/6.3
D3
C32 0.01
D2
R17 1.5K
R19 560
R21 560
C29 0.01
Q3
L4 56
C31 33P
R10 15K
R18 3.3K
R20 560
Q4
Q5
D5
D4
R24 22K
R23 22K
C26 0.022
C27 47/6.3
L6 100
6
5
4
3
2
1
A
B
C
E
F
G
H

3.24 PRE/REC AMP CIRCUIT BOARD

– PRE/REC AMP –

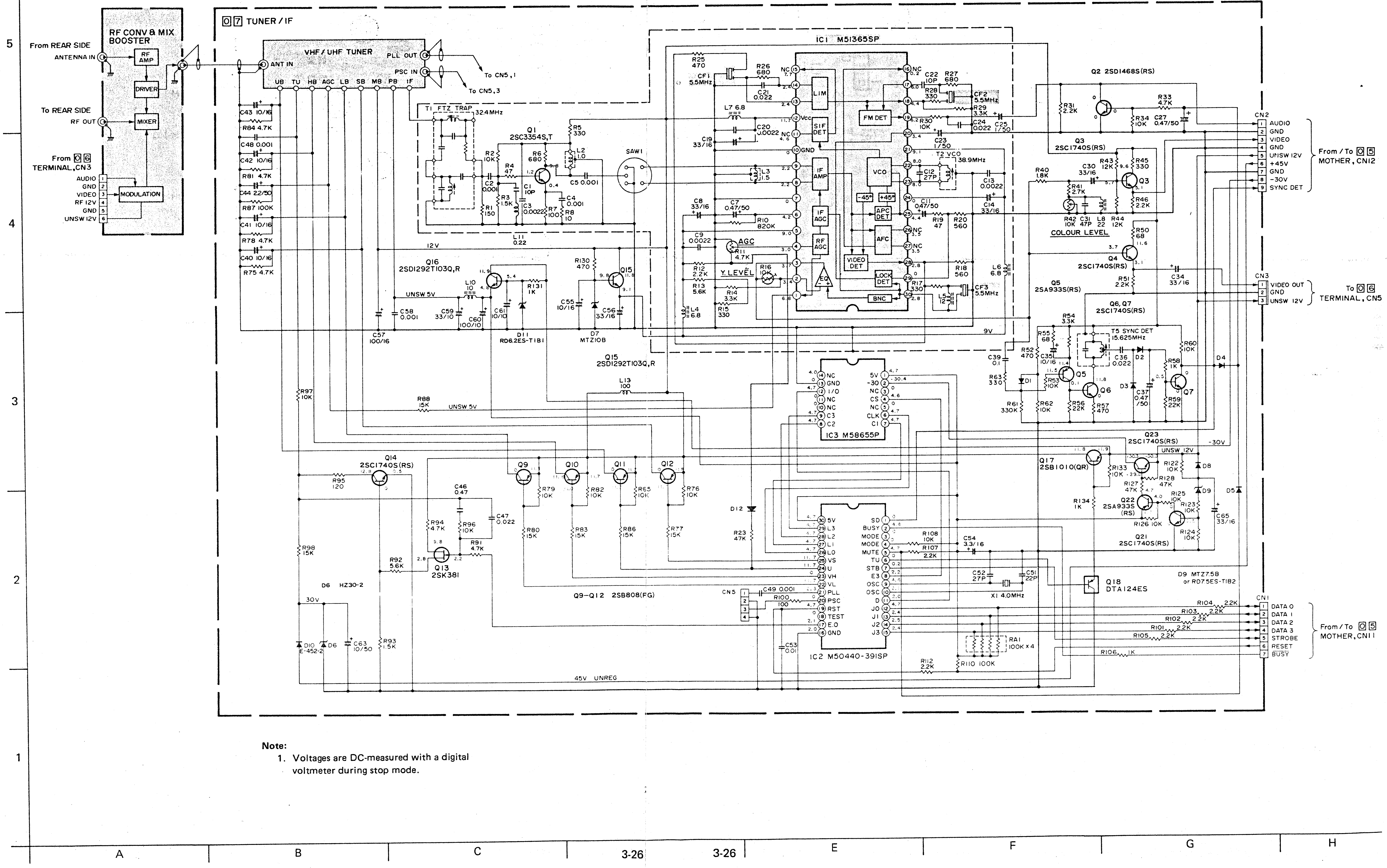

C5
SP CH-2 fo
R1
SP CH-2 Q
C7
SP CH-1 fo
R2
SP CH-1 Q
R3
LP CH-1 Q
C13
LP CH-1 fo
R4
LP CH-2 Q
C15
LP CH-2 fo
CN1
CN2
CN3
IC1
TP1
TP2
TP3
TP4
TP5
TP6
Q1
Q2
Q3
Q5
Q6
D2
D3
D4
D5
L1
L2
L3
L4
L5
L6
L7
ELNA-
437 94V-0
PRE/REC AMP PWB
PU36147-01-02
PU36147 A B C-02
PRE/REC PWB ASS'Y
4 3
A

– UPPER DRUM –


EP CH2
SP CH2
SP CHI
EP CHI

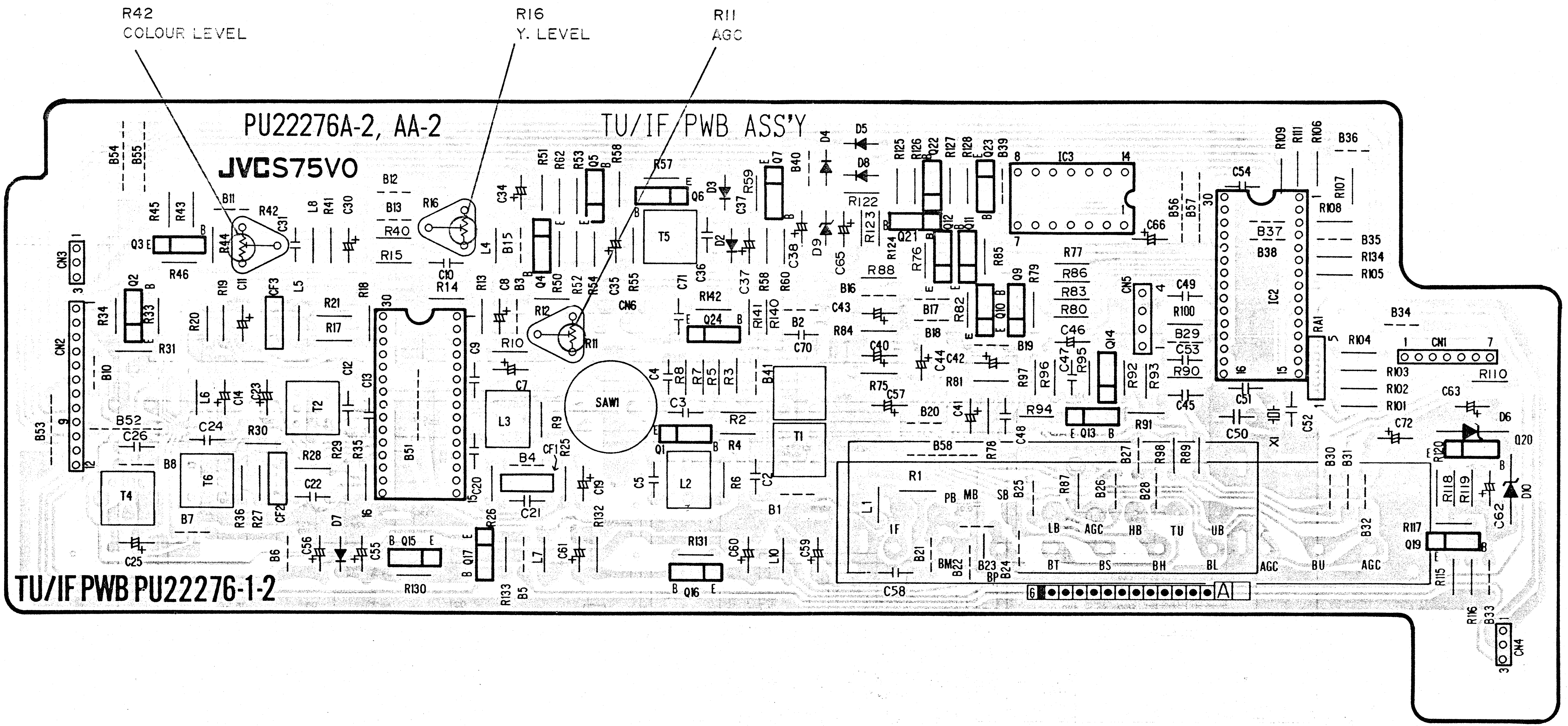
4 I UPPER DRUM PWB
PDM3018

3.25 TUNER/IF SCHEMATIC DIAGRAM (HR-D180E/EG only)


RF CONV & MIX BOOSTER
From REAR SIDE ANTENNA IN
RF AMP
DRIVER
MIXER
To REAR SIDE RF OUT
From 06 TERMINAL, CN3
AUDIO
GND
VIDEO
RF 12V
GND
UNSW 12V
MODULATION
07 TUNER / IF
VHF / UHF TUNER
ANT IN
PLL OUT
PSC IN
UB TU HB AGC LB SB MB PB IF
To CN5, 1
To CN5, 3
T1 FTZ TRAP 32.4MHz
Q1 2SC3354S,T
SAW1
IC1 M51365SP
LIM
SIF DET
FM DET
IF AMP
IF AGC
RF AGC
VCO
-45° +45°
APC DET
AFC
VIDEO DET
LOCK DET
BNC
EQ
CF1 5.5MHz
CF2 5.5MHz
CF3 5.5MHz
T2 VCO 38.9MHz
AGC
Y. LEVEL
COLOUR LEVEL
Q2 2SD1468S(RS)
Q3 2SC1740S(RS)
Q4 2SC1740S(RS)
Q5 2SA933S(RS)
Q6, Q7 2SC1740S(RS)
T5 SYNC DET 15.625MHz
Q15 2SD1292T103Q,R
Q16 2SD1292T103Q,R
D11 RD6.2ES-T1B1
D7 MTZ10B
12V
UNSW 5V
9V
IC3 M58655P
Q14 2SC1740S(RS)
Q13 2SK381
Q9–Q12 2SB808(FG)
D6 HZ30-2
30V
45V UNREG
IC2 M50440-391SP
X1 4.0MHz
CN5
Q17 2SB1010(QR)
Q23 2SC1740S(RS)
Q22 2SA933S (RS)
Q21 2SC1740S(RS)
Q18 DTA124ES
D9 MTZ7.58 or RD7.5ES-T1B2
RA1 100K x 4
UNSW 12V
-30V
CN2
AUDIO
GND
VIDEO
GND
UNSW 12V
+45V
GND
-30V
SYNC DET
From / To 05 MOTHER, CN12
CN3
VIDEO OUT
GND
UNSW 12V
To 06 TERMINAL, CN5
CN1
DATA 0
DATA 1
DATA 2
DATA 3
STROBE
RESET
BUSY
From / To 05 MOTHER, CN11
6
5
4
3
2
1
A
B
C
E
F
G
H

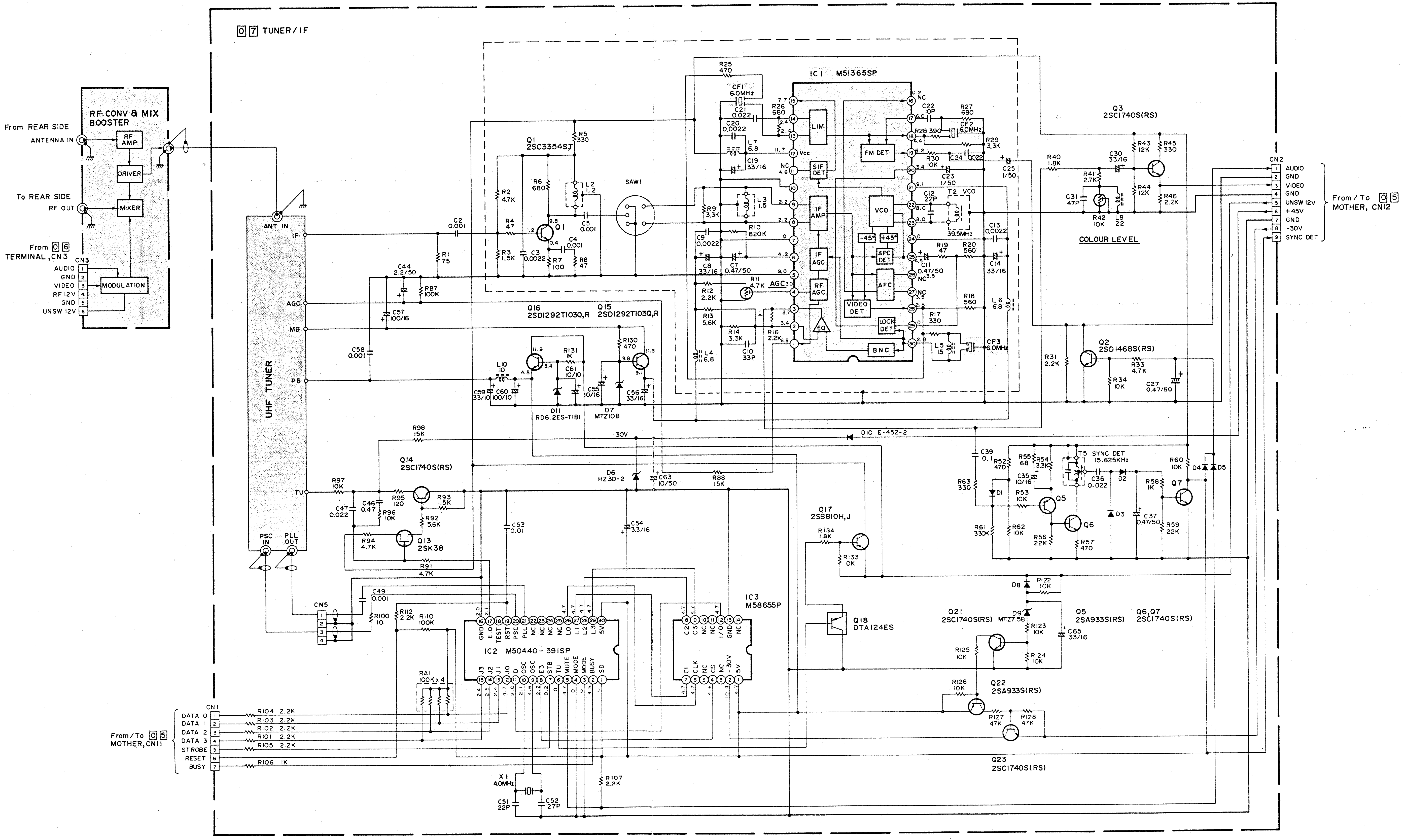
Note:
1. Voltages are DC-measured with a digital voltmeter during stop mode.

3.26 TUNER/IF CIRCUIT BOARD
(HR-D180E/EG only)


R42
COLOUR LEVEL
R16
Y. LEVEL
R11
AGC
PU22276A-2, AA-2
TU/IF/PWB ASS'Y
JVC S75VO
SAW1
IC3
IC2
CN1
CN2
CN3
CN4
CN5
CN6
TU/IF PWB PU22276-1-2

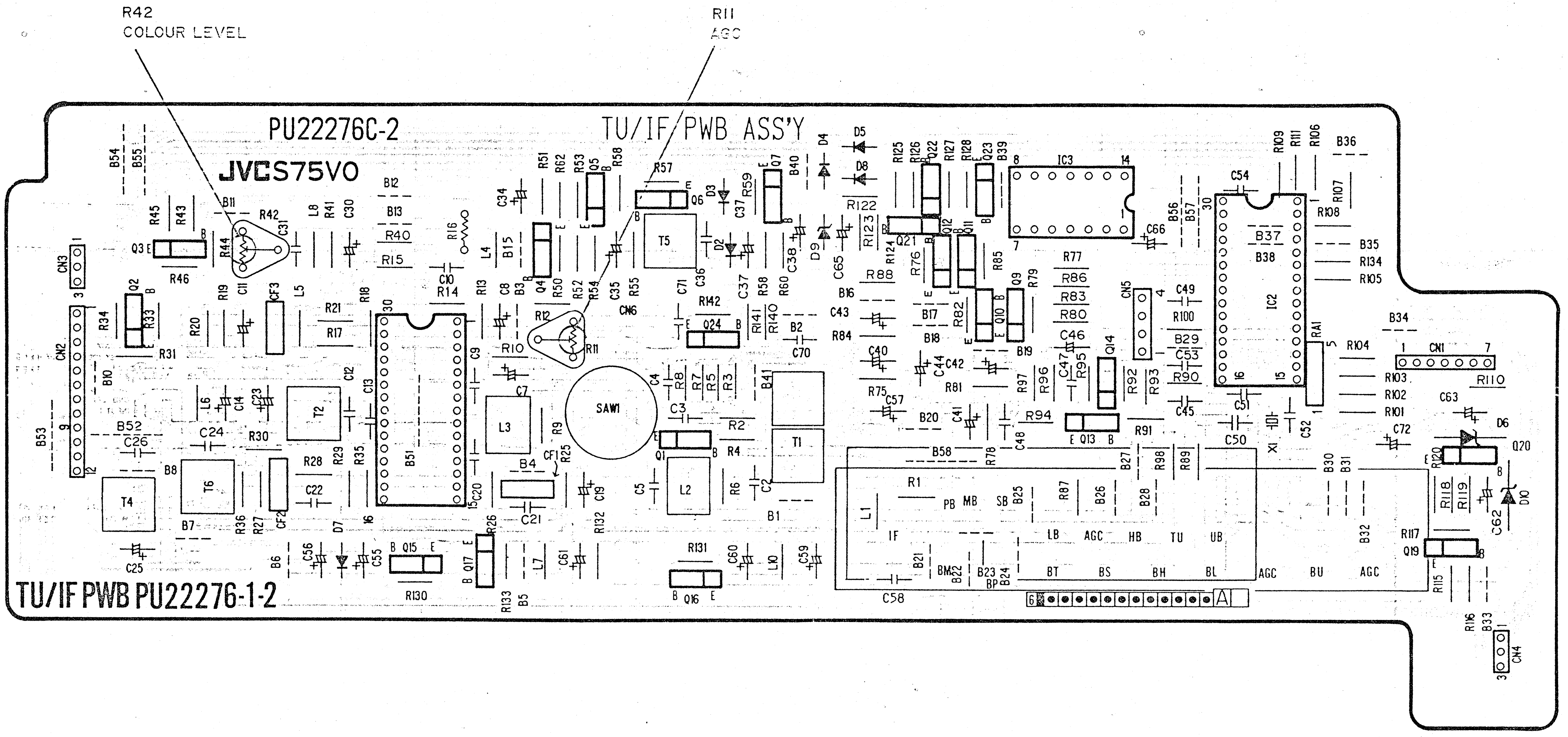
6
5
4
3
2
1
A
B
C
E
F
G
H

3.27 TUNER/IF SCHEMATIC DIAGRAM
(HR-D180EK only)


07 TUNER/IF
RF CONV & MIX BOOSTER
From REAR SIDE
ANTENNA IN
RF AMP
DRIVER
To REAR SIDE
RF OUT
MIXER
From 06 TERMINAL, CN3
CN3
AUDIO
GND
VIDEO
RF 12V
GND
UNSW 12V
MODULATION
UHF TUNER
ANT IN
IF
AGC
MB
PB
TU
PSC IN
PLL OUT
Q1 2SC3354S,T
Q16 2SD1292T1030,R
Q15 2SD1292T1030,R
SAW1
IC1 M51365SP
LIM
SIF DET
IF AMP
IF AGC
RF AGC
EQ
FM DET
VCO
-45°
+45°
APC DET
AFC
VIDEO DET
LOCK DET
BNC
CF1 6.0MHz
CF2 6.0MHz
CF3 6.0MHz
T2 VCO
39.5MHz
D11 RD6.2ES-T1B1
D7 MTZ108
D6 HZ30-2
D10 E-452-2
30V
Q14 2SC1740S(RS)
Q13 2SK38
Q3 2SC1740S(RS)
COLOUR LEVEL
Q2 2SD1468S(RS)
T5 SYNC DET 15.625KHz
Q17 2SB810H,J
Q18 DTA124ES
Q21 2SC1740S(RS)
D9 MTZ7.5B
Q22 2SA933S(RS)
Q23 2SC1740S(RS)
Q5 2SA933S(RS)
Q6,Q7 2SC1740S(RS)
IC2 M50440-391SP
IC3 M58655P
X1 4.0MHz
RA1 100Kx4
CN5
CN1
DATA 0
DATA 1
DATA 2
DATA 3
STROBE
RESET
BUSY
From/To 05 MOTHER, CN11
CN2
AUDIO
GND
VIDEO
GND
UNSW 12V
+45V
GND
-30V
SYNC DET
From/To 05 MOTHER, CN12

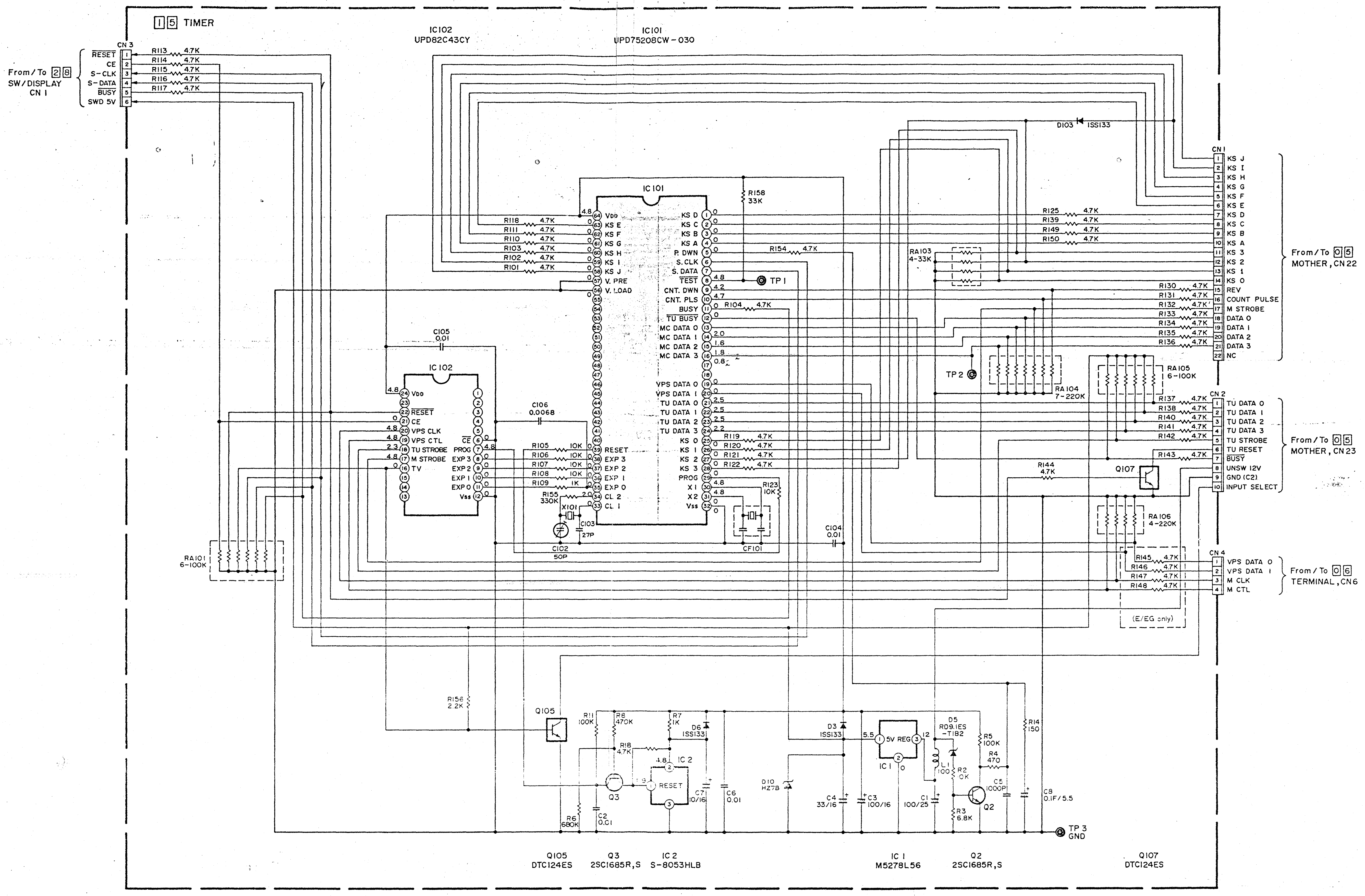
Note:
1. Voltages are DC-measured with a digital voltmeter during stop mode.

3.28 TUNER/IF CIRCUIT BOARD
(HR-D180EK only)


R42
COLOUR LEVEL
R11
AGC
PU22276C-2
TU/IF/PWB ASS'Y
JVC S75V0
TU/IF PWB PU22276-1-2
IC1
IC2
IC3
SAW1
T1
T2
T4
T5
T6
L2
L3
CN1
CN2
CN3
CN4
CN5
CN6
IF
LB
AGC
HB
TU
UB
PB
MB
SB
BM
BP
BT
BS
BH
BL
BU

6
5
4
3
2
1
A
B
C
E
F
G
H

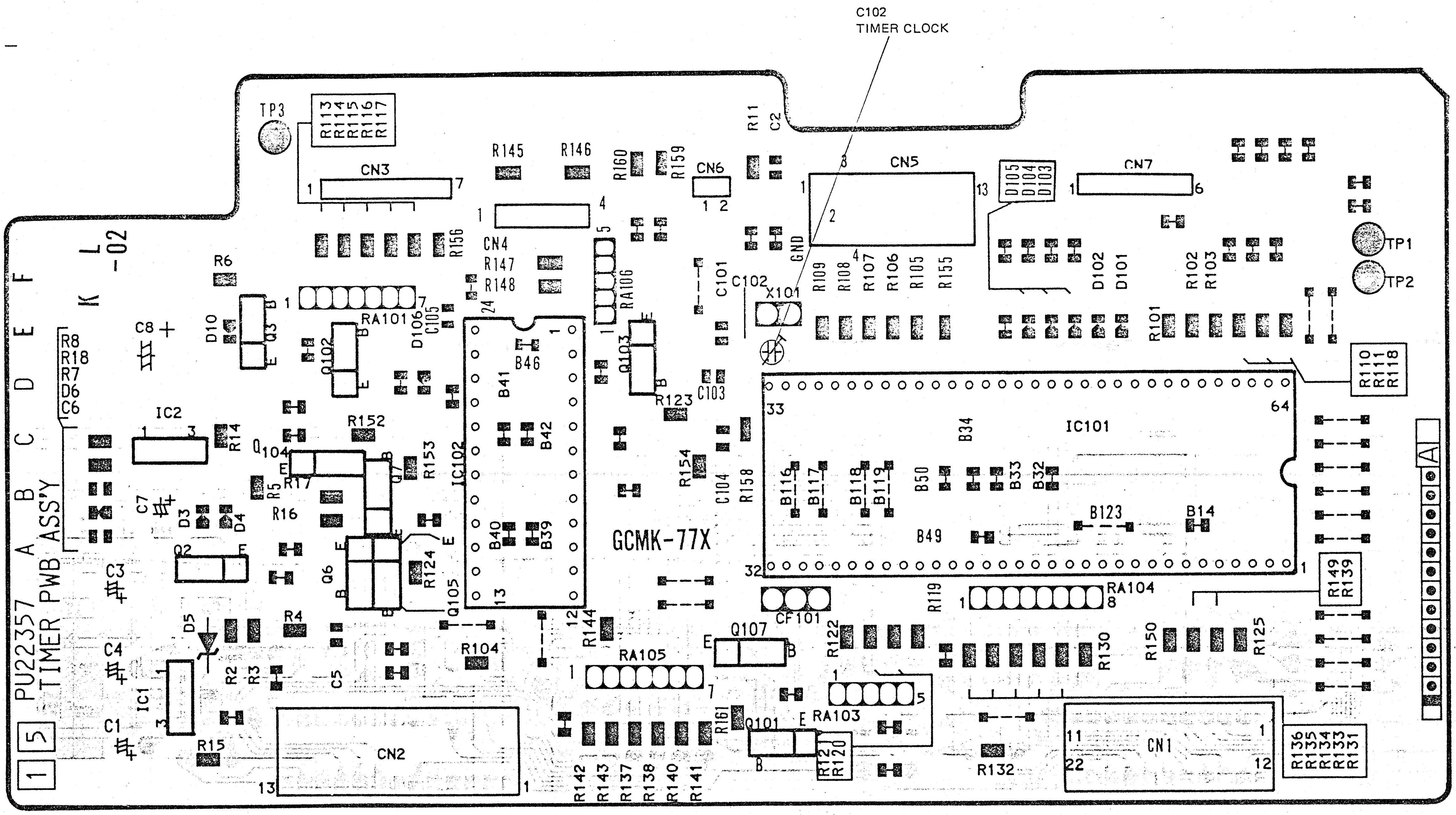
3.29 TIMER SCHEMATIC DIAGRAM


15 TIMER
From/To 28 SW/DISPLAY CN 1
CN 3
RESET
CE
S-CLK
S-DATA
BUSY
SWD 5V
R113 4.7K
R114 4.7K
R115 4.7K
R116 4.7K
R117 4.7K
IC102 UPD82C43CY
IC101 UPD75208CW-030
D103 1SS133
R158 33K
R118 4.7K
R111 4.7K
R110 4.7K
R103 4.7K
R102 4.7K
R101 4.7K
VDD
KS E
KS F
KS G
KS H
KS I
KS J
V. PRE
V. LOAD
KS D
KS C
KS B
KS A
P. DWN
S. CLK
S. DATA
TEST
CNT. DWN
CNT. PLS
BUSY
TU BUSY
MC DATA 0
MC DATA 1
MC DATA 2
MC DATA 3
VPS DATA 0
VPS DATA 1
TU DATA 0
TU DATA 1
TU DATA 2
TU DATA 3
KS 0
KS 1
KS 2
KS 3
PROG
X1
X2
VSS
RESET
EXP 3
EXP 2
EXP 1
EXP 0
CL 2
CL 1
TP 1
TP 2
R154 4.7K
R104 4.7K
R119 4.7K
R120 4.7K
R121 4.7K
R122 4.7K
R123 10K
R105 10K
R106 10K
R107 10K
R108 10K
R109 1K
R155 330K
X101
C103 27P
C102 50P
CF101
C104 0.01
C105 0.01
C106 0.0068
IC 102
VDD
RESET
CE
VPS CLK
VPS CTL
TU STROBE
M STROBE
TV
CE
PROG
EXP 3
EXP 2
EXP 1
EXP 0
VSS
RA101 6-100K
RA103 4-33K
RA104 7-220K
RA105 6-100K
RA106 4-220K
R125 4.7K
R139 4.7K
R149 4.7K
R150 4.7K
R130 4.7K
R131 4.7K
R132 4.7K
R133 4.7K
R134 4.7K
R135 4.7K
R136 4.7K
CN 1
KS J
KS I
KS H
KS G
KS F
KS E
KS D
KS C
KS B
KS A
KS 3
KS 2
KS 1
KS 0
REV
COUNT PULSE
M STROBE
DATA 0
DATA 1
DATA 2
DATA 3
NC
From/To 05 MOTHER, CN 22
CN 2
R137 4.7K
R138 4.7K
R140 4.7K
R141 4.7K
R142 4.7K
R143 4.7K
R144 4.7K
Q107
TU DATA 0
TU DATA 1
TU DATA 2
TU DATA 3
TU STROBE
TU RESET
BUSY
UNSW 12V
GND (C2)
INPUT SELECT
From/To 05 MOTHER, CN 23
CN 4
R145 4.7K
R146 4.7K
R147 4.7K
R148 4.7K
VPS DATA 0
VPS DATA 1
M CLK
M CTL
(E/EG only)
From/To 06 TERMINAL, CN6
R156 2.2K
Q105
R11 100K
R8 470K
R7 1K
D6 1SS133
R18 4.7K
IC 2
RESET
Q3
R6 680K
C2 0.01
C7 10/16
C6 0.01
D10 HZ7B
D3 1SS133
C4 33/16
C3 100/16
5V REG
IC 1
C1 100/25
D5 RD9.1ES -T1B2
L1 100
R2 0K
R3 6.8K
Q2
R5 100K
R4 470
C5 1000P
R14 150
C8 0.1F/5.5
TP 3 GND
Q105 DTC124ES
Q3 2SC1685R,S
IC 2 S-8053HLB
IC 1 M5278L56
Q2 2SC1685R,S
Q107 DTC124ES

Note:
1. Voltages are DC-measured with a digital voltmeter during stop mode.

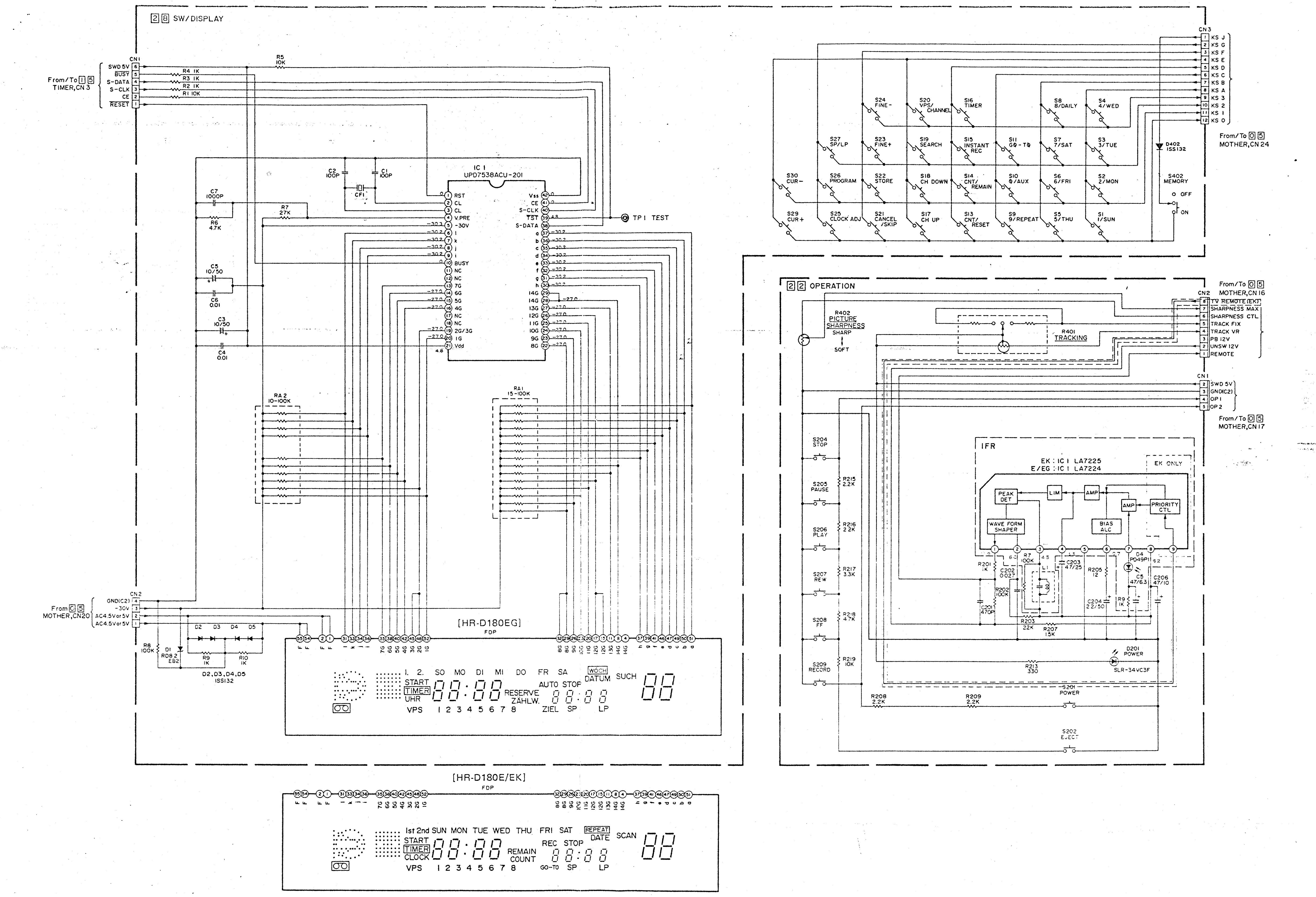
3.30 TIMER CIRCUIT BOARD

– TIMER –



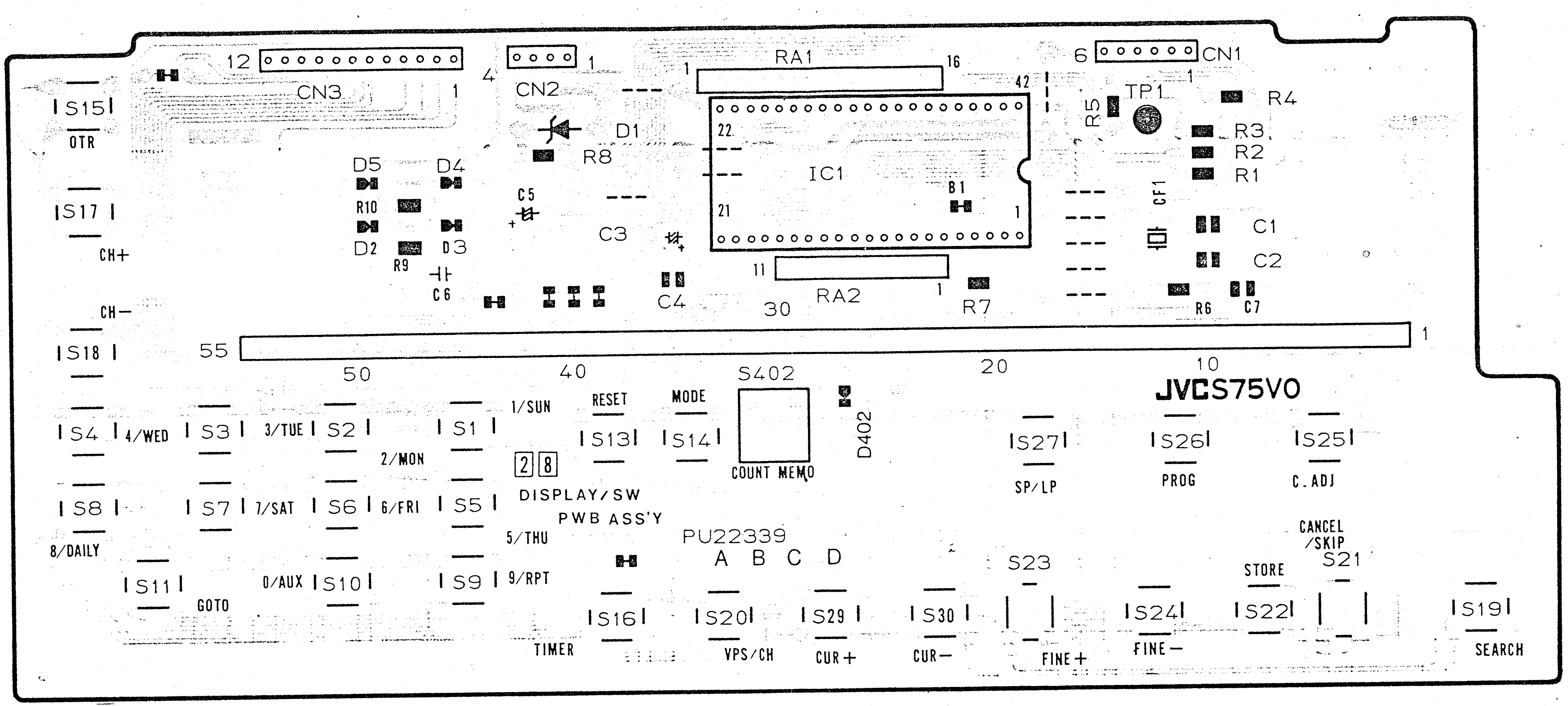
C102
TIMER CLOCK
TP3
R113 R114 R115 R116 R117
CN3
R145
R146
R160
R159
CN6
R11
C2
CN5
D105 D104 D103
CN7
CN4
R147
R148
RA106
C101
C102
X101
GND
R109 R108 R107 R106 R105 R155
D102 D101
R102 R103
R101
TP1
TP2
R110 R111 R118
R6
C8
D10
Q3
RA101
D106
C105
Q102
IC102
B46
B41
B42
B40
B39
Q103
R123
C103
GCMK-77X
R8 R18 R7 D6 C6
IC2
R14
Q104
R152
R153
R5
R17
R16
C7
D3
D4
Q2
Q6
R124
Q105
C3
C4
D5
R4
R2
R3
C5
IC1
C1
R15
CN2
R104
R144
R154
C104
R158
IC101
B34
B116 B117 B118 B119
B50
B33
B32
B123
B14
B49
CF101
Q107
RA105
R119
RA104
R149 R139
R122
R130
R150
R125
RA103
R161
Q101
R121 R120
R132
CN1
R136 R135 R134 R133 R131
R142 R143 R137 R138 R140 R141
A
PU22357 A B C D E F
TIMER PWB ASS'Y
K L -02
1 5

3.31 SWITCH/DISPLAY AND OPERATION SCHEMATIC DIAGRAMS



28 SW/DISPLAY
From/To 15 TIMER,CN 3
CN1
SWD 5V
BUSY
S-DATA
S-CLK
CE
RESET
R5 10K
R4 1K
R3 1K
R2 1K
R1 10K
IC 1 UPD7538ACU-201
C2 100P
C1 100P
CF1
C7 1000P
R6 4.7K
R7 27K
C5 10/50
C6 0.01
C3 10/50
C4 0.01
TP1 TEST
RST
CL
V.PRE
-30V
BUSY
NC
Vss
CE
S-CLK
TST
S-DATA
Vdd
RA2 10-100K
RA1 15-100K
From C5 MOTHER,CN20
CN2
GND(C2)
-30V
AC4.5Vor5V
R8 100K
D1 RD8.2 EB2
D2
D3
D4
D5
R9 1K
R10 1K
D2,D3,D4,D5 1SS132
[HR-D180EG]
FDP
1. 2. SO MO DI MI DO FR SA
WOCH
DATUM
SUCH
START
TIMER
UHR
RESERVE
ZÄHLW.
AUTO STOP
ZIEL SP LP
VPS 1 2 3 4 5 6 7 8
[HR-D180E/EK]
FDP
1st 2nd SUN MON TUE WED THU FRI SAT
REPEAT
DATE
SCAN
CLOCK
REMAIN
COUNT
REC STOP
GO-TO SP LP
CN3
KS J
KS G
KS F
KS E
KS D
KS C
KS B
KS A
KS 3
KS 2
KS 1
KS 0
From/To 05 MOTHER,CN 24
S24 FINE-
S20 VPS/CHANNEL
S16 TIMER
S8 8/DAILY
S4 4/WED
S27 SP/LP
S23 FINE+
S19 SEARCH
S15 INSTANT REC
S11 GO-TO
S7 7/SAT
S3 3/TUE
D402 1SS132
S30 CUR-
S26 PROGRAM
S22 STORE
S18 CH DOWN
S14 CNT/REMAIN
S10 0/AUX
S6 6/FRI
S2 2/MON
S402 MEMORY
OFF
ON
S29 CUR+
S25 CLOCK ADJ
S21 CANCEL/SKIP
S17 CH UP
S13 CNT/RESET
S9 9/REPEAT
S5 5/THU
S1 1/SUN
22 OPERATION
From/To 05 MOTHER,CN 16
CN2
TV REMOTE(EK)
SHARPNESS MAX
SHARPNESS CTL
TRACK FIX
TRACK VR
PB 12V
UNSW 12V
REMOTE
R402 PICTURE SHARPNESS
SHARP
SOFT
R401 TRACKING
CN1
SWD 5V
GND(C2)
OP 1
OP 2
From/To 05 MOTHER,CN 17
S204 STOP
S205 PAUSE
S206 PLAY
S207 REW
S208 FF
S209 RECORD
R215 2.2K
R216 2.2K
R217 3.3K
R218 4.7K
R219 10K
IFR
EK : IC 1 LA7225
E/EG : IC 1 LA7224
EK ONLY
PEAK DET
LIM
AMP
AMP
PRIORITY CTL
WAVE FORM SHAPER
BIAS ALC
R201 1K
C202 0.027
R7 100K
L1
C203 47/25
R205 12
D4 PD49PI
C5 47/6.3
C206 47/10
C201 470P
R202 100K
R203 22K
R207 15K
C204 22/50
R9 1K
R213 330
D201 POWER
SLR-34VC3F
R208 2.2K
R209 2.2K
S201 POWER
S202 EJECT

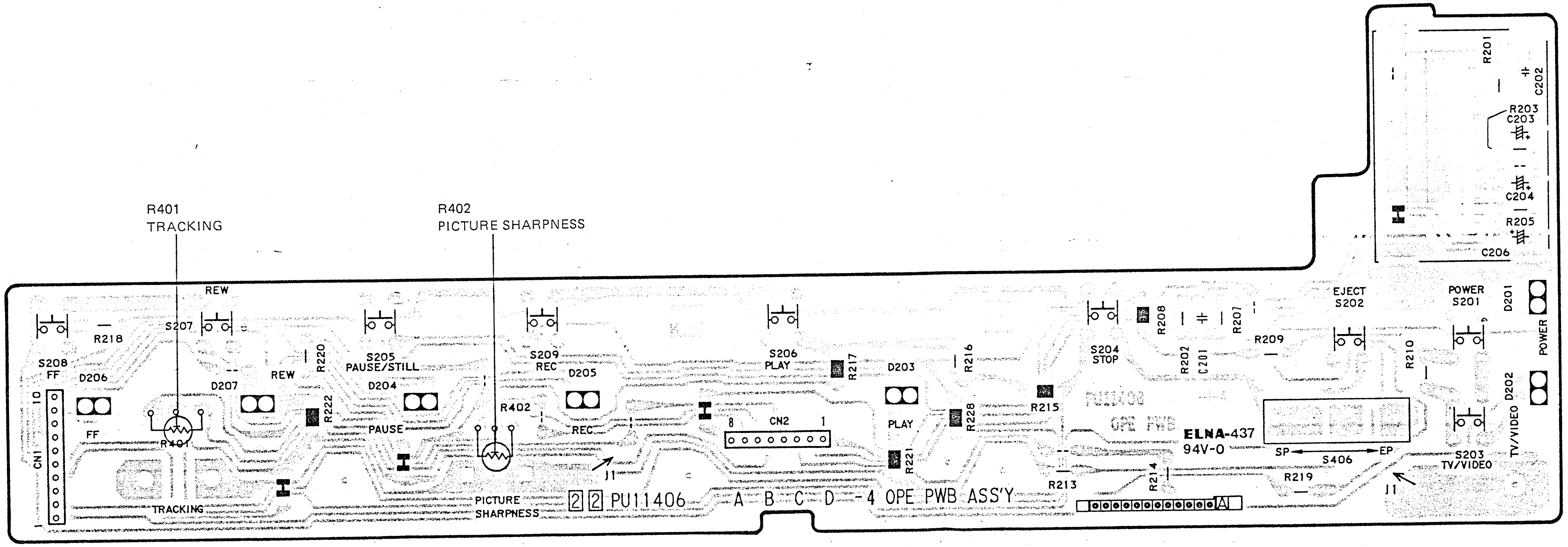
3.32 SWITCH/DISPLAY CIRCUIT BOARD



12
CN3
1
4
CN2
1
RA1
16
6
CN1
1
S15
OTR
D1
R8
42
22
R5
TP1
R4
R3
R2
R1
D5
D4
R10
C5
IC1
B1
CF1
S17
CH+
D2
D3
R9
C6
C3
21
1
C1
C2
11
RA2
1
C4
30
R7
R6
C7
CH−
S18
55
50
40
S402
20
10
1
JVC S75V0
D402
S4
4/WED
S3
3/TUE
S2
2/MON
S1
1/SUN
RESET
S13
MODE
S14
COUNT MEMO
S27
SP/LP
S26
PROG
S25
C.ADJ
2 8
DISPLAY/SW
PWB ASS'Y
S8
S7
1/SAT
S6
6/FRI
S5
5/THU
PU22339
A B C D
S23
CANCEL
/SKIP
S21
8/DAILY
S11
GOTO
0/AUX
S10
S9
9/RPT
STORE
S16
TIMER
S20
VPS/CH
S29
CUR+
S30
CUR−
FINE+
S24
FINE−
S22
S19
SEARCH

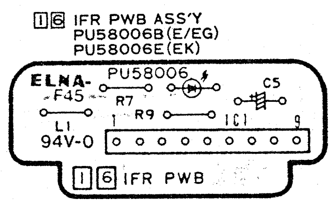
3.33 OPERATION AND IFR CIRCUIT BOARDS

— OPERATION —



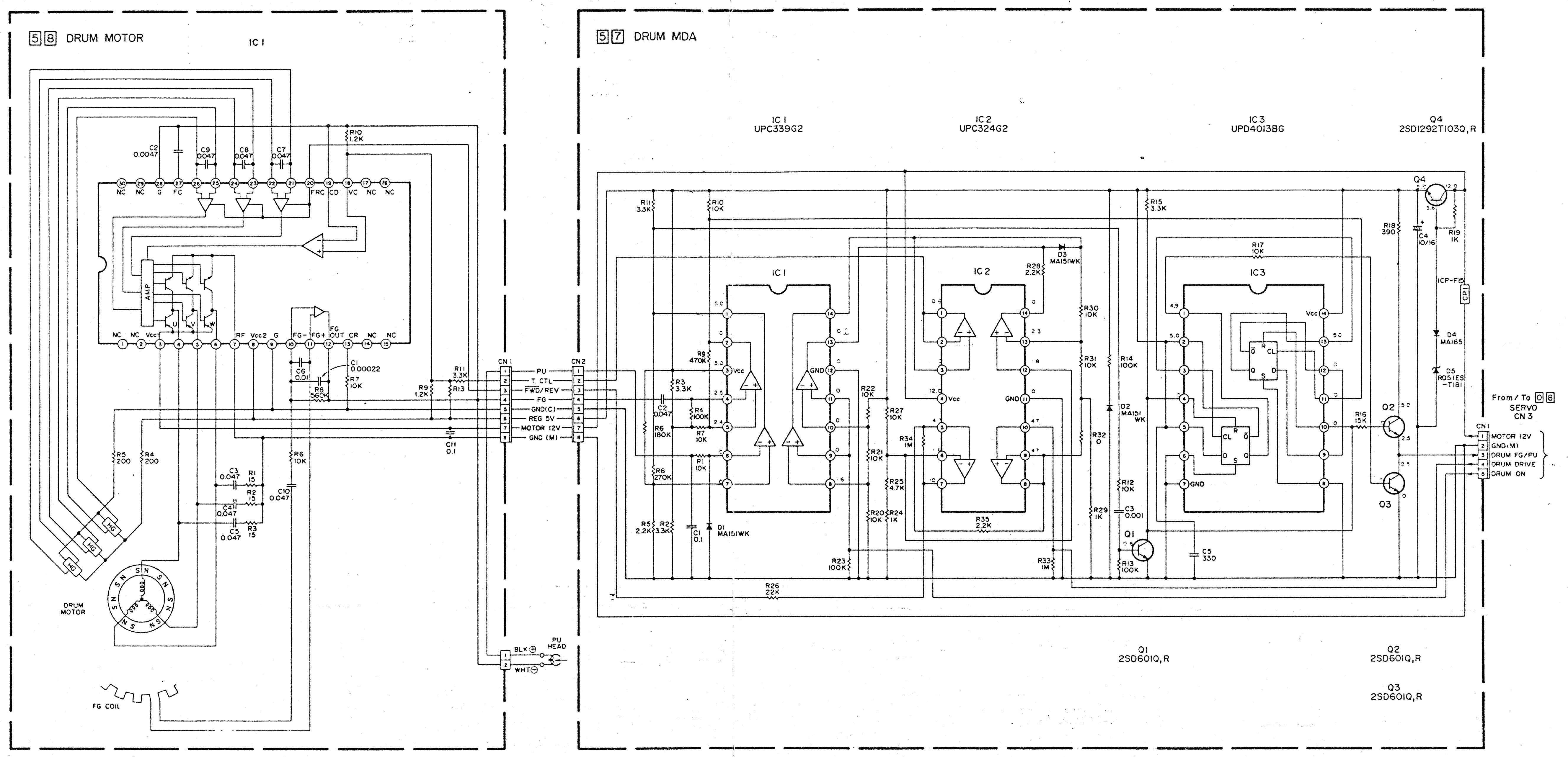
R401
TRACKING
R402
PICTURE SHARPNESS
R201
C202
R203
C203
C204
R205
C206
REW
R218
S207
S208
FF
D206
D207
REW
R220
S205
PAUSE/STILL
D204
R222
PAUSE
S209
REC
D205
R402
REC
S206
PLAY
R217
D203
R216
CN2
8
1
PLAY
R228
R221
S204
STOP
R208
R207
R202
C201
R215
EJECT
S202
R209
POWER
S201
D201
POWER
R210
D202
TV/VIDEO
FF
CN1
10
1
R401
TRACKING
J1
PICTURE
SHARPNESS
2 2 PU11406 A B C D 4 OPE PWB ASS'Y
ELNA-437
94V-0
SP
S406
EP
R213
R214
R219
S203
TV/VIDEO
J1
A

— IFR —



1 6 IFR PWB ASS'Y
PU58006B(E/EG)
PU58006E(EK)
ELNA-F45
PU58006
R7
C5
L1
R9
IC1
1
9
94V-0
1 6 IFR PWB

3.34 DRUM MDA AND DRUM MOTOR SCHEMATIC DIAGRAMS



58 DRUM MOTOR
IC 1
C2 0.0047
C9 0.047
C8 0.047
C7 0.047
R10 1.2K
NC NC G FC FRC CD VC NC NC
AMP
U V W
NC NC Vcc1 RF Vcc2 G FG- FG+ FG OUT CR NC NC
C1 0.00022
C6 0.01
R7 10K
R8 560K
R9 1.2K
R11 3.3K
R13
C11 0.1
R5 200
R4 200
R6 10K
C3 0.047
R1 15
R2 15
C4 0.047
C5 0.047
R3 15
C10 0.047
HG
DRUM MOTOR
FG COIL
CN1
PU
T. CTL
FWD/REV
FG
GND(C)
REG 5V
MOTOR 12V
GND (M)
BLK ⊕
WHT ⊖
PU HEAD
CN2
57 DRUM MDA
IC 1 UPC339G2
IC 2 UPC324G2
IC 3 UPD4013BG
Q4 2SD1292T103Q,R
R11 3.3K
R10 10K
R9 470K
R3 3.3K
C2 0.047
R4 100K
R6 180K
R7 10K
R1 10K
R8 270K
R5 2.2K
R2 3.3K
C1 0.1
D1 MA151WK
Vcc
GND
R22 10K
R27 10K
R21 10K
R25 4.7K
R20 10K
R24 1K
R23 100K
R26 22K
R28 2.2K
D3 MA151WK
R30 10K
R31 10K
R34 1M
R35 2.2K
R33 1M
R32 0
R29 1K
R14 100K
D2 MA151 WK
R12 10K
C3 0.001
R13 100K
Q1
R15 3.3K
R17 10K
CL D Q Q̄ R S
C5 330
R16 15K
Q2
Q3
R18 390
C4 10/16
R19 1K
ICP-F15
CP1
D4 MA165
D5 RD5.1ES -T1B1
From/To 08 SERVO CN 3
CN1
MOTOR 12V
GND(M)
DRUM FG/PU
DRUM DRIVE
DRUM ON
Q1 2SD601Q,R
Q2 2SD601Q,R
Q3 2SD601Q,R

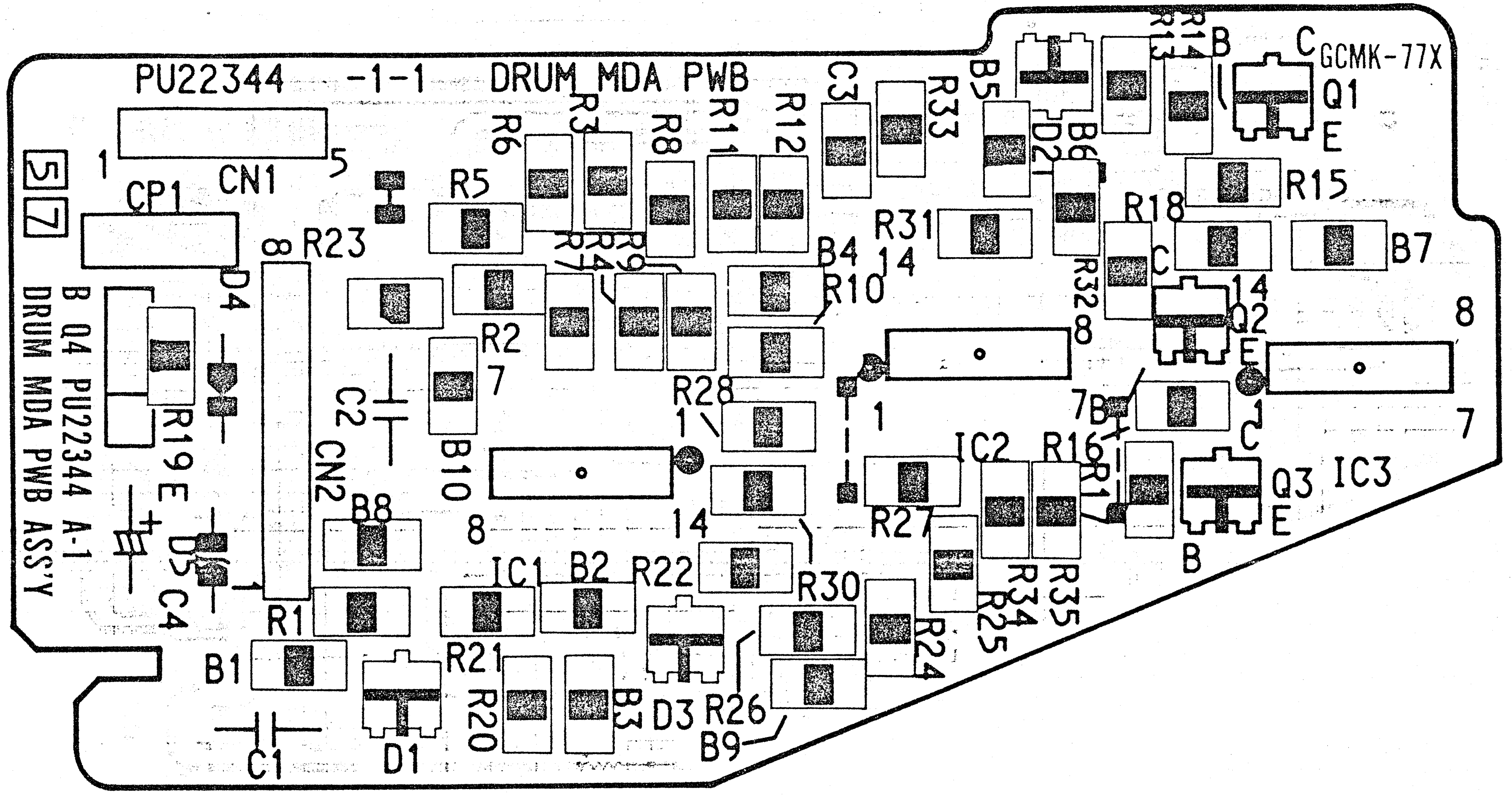
Note: Voltages are DC-measured with a digital voltmeter during stop mode.

6

3.35 DRUM MDA CIRCUIT BOARD

5

4


PU22344 -1-1 DRUM MDA PWB
B Q4 PU22344 A-1
DRUM MDA PWB ASS'Y
GCMK-77X
CN1
CN2
CP1
IC1
IC2
IC3
Q1
Q2
Q3
D1
D2
D3
D4
D5
C1
C2
C3
C4
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
R25
R26
R27
R28
R30
R31
R32
R33
R34
R35
B1
B2
B3
B4
B5
B6
B7
B8
B9
B10
B
C
E
1
5
7
8
14

3

2

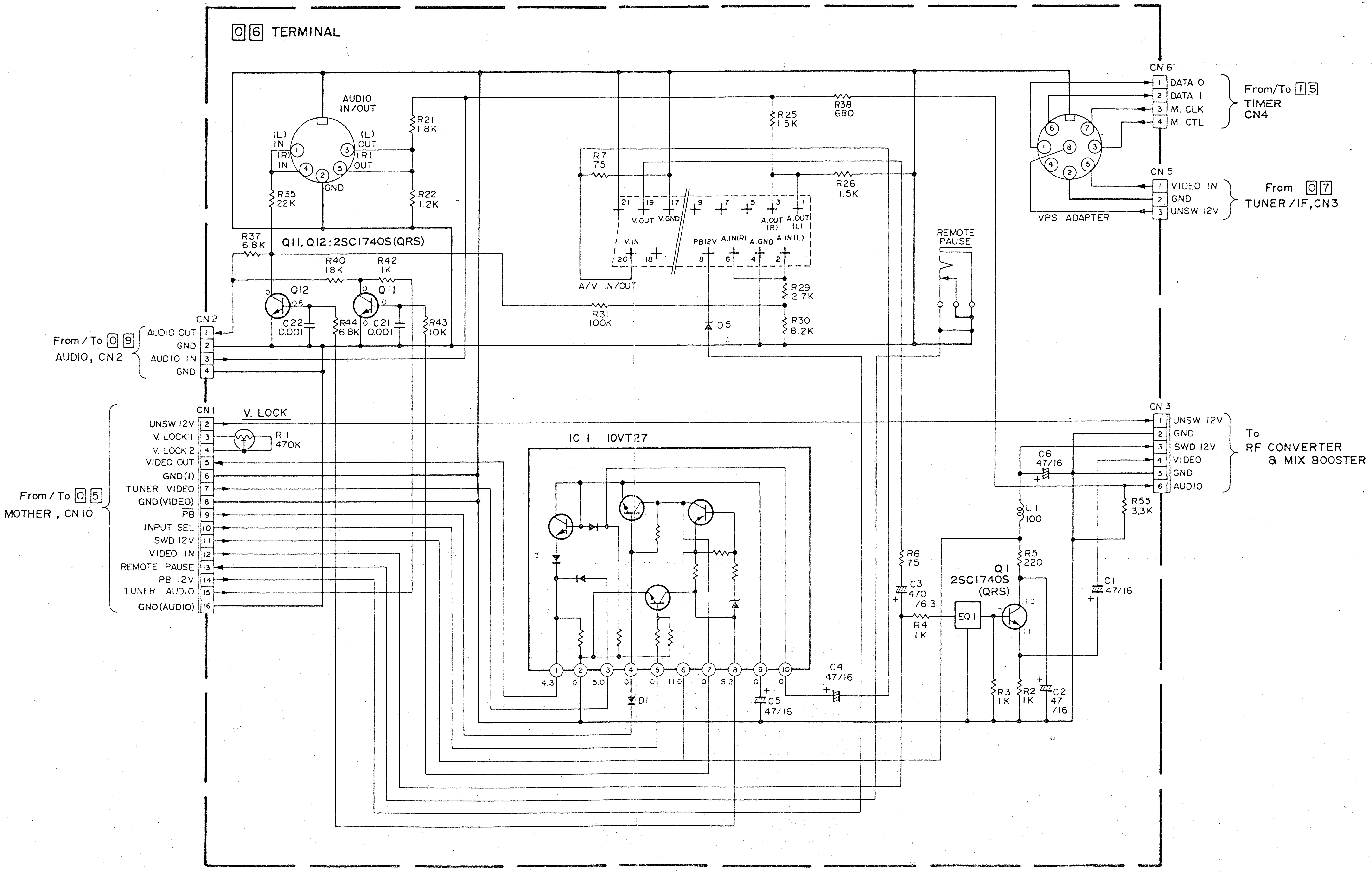
1

A B C

E F G H

3.36 TERMINAL SCHEMATIC DIAGRAM

(HR-D180E/EG only)

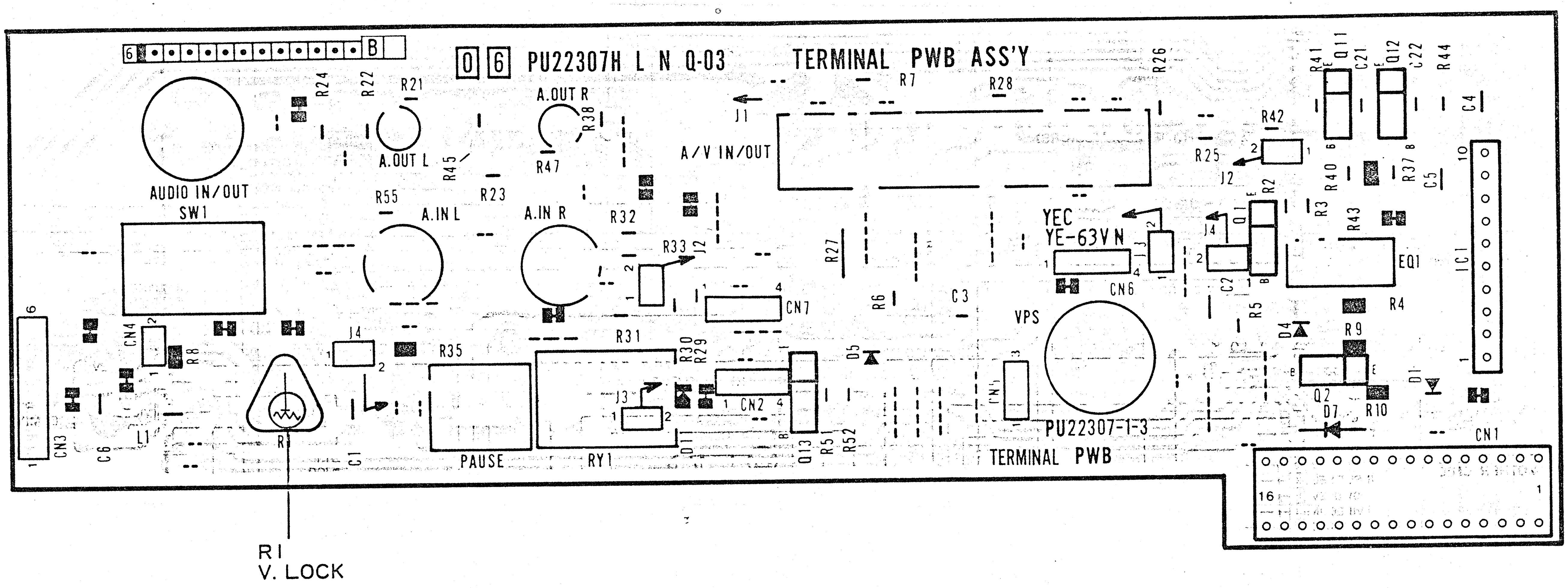


06 TERMINAL
AUDIO IN/OUT
(L) IN
(R) IN
(L) OUT
(R) OUT
GND
R21 1.8K
R22 1.2K
R35 22K
R37 6.8K
Q11, Q12: 2SC1740S(QRS)
R40 18K
R42 1K
Q12
Q11
C22 0.001
R44 6.8K
C21 0.001
R43 10K
CN2
AUDIO OUT 1
GND 2
AUDIO IN 3
GND 4
From / To 09 AUDIO, CN2
CN1
V. LOCK
R1 470K
UNSW 12V 2
V. LOCK 1 3
V. LOCK 2 4
VIDEO OUT 5
GND(1) 6
TUNER VIDEO 7
GND(VIDEO) 8
PB 9
INPUT SEL 10
SWD 12V 11
VIDEO IN 12
REMOTE PAUSE 13
PB 12V 14
TUNER AUDIO 15
GND(AUDIO) 16
From / To 05 MOTHER, CN10
R7 75
R25 1.5K
R38 680
R26 1.5K
V. OUT
V. GND
A. OUT (R)
A. OUT (L)
V. IN
PB12V
A. IN(R)
A. GND
A. IN(L)
A/V IN/OUT
R29 2.7K
R30 8.2K
R31 100K
D5
REMOTE PAUSE
IC 1 10VT27
4.3
0
5.0
0
0
11.9
0
8.2
0
0
D1
C5 47/16
C4 47/16
R6 75
C3 470 /6.3
R4 1K
EQ1
Q1 2SC1740S (QRS)
R5 220
L1 100
R3 1K
R2 1K
C2 47 /16
C1 47/16
C6 47/16
R55 3.3K
CN6
1 DATA 0
2 DATA 1
3 M. CLK
4 M. CTL
From/To 15 TIMER CN4
CN5
1 VIDEO IN
2 GND
3 UNSW 12V
From 07 TUNER / IF, CN3
VPS ADAPTER
CN3
1 UNSW 12V
2 GND
3 SWD 12V
4 VIDEO
5 GND
6 AUDIO
To RF CONVERTER & MIX BOOSTER
6
5
4
3
2
1
A
B
C
E
F
G
H

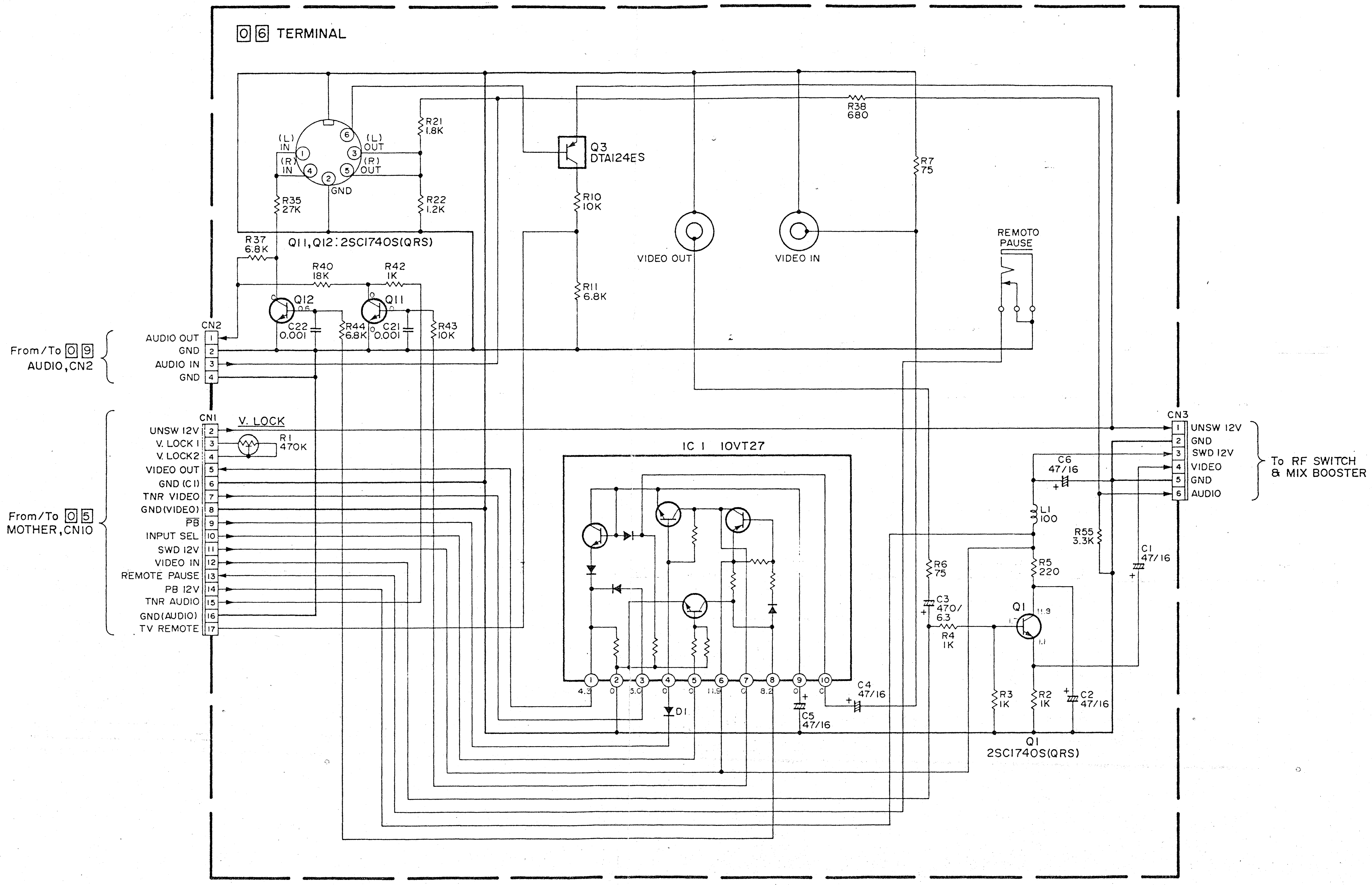
Note:

1. Voltages are DC-measured with a digital voltmeter during stop mode.

3.37 TERMINAL CIRCUIT BOARD
(HR-D180E/EG only)

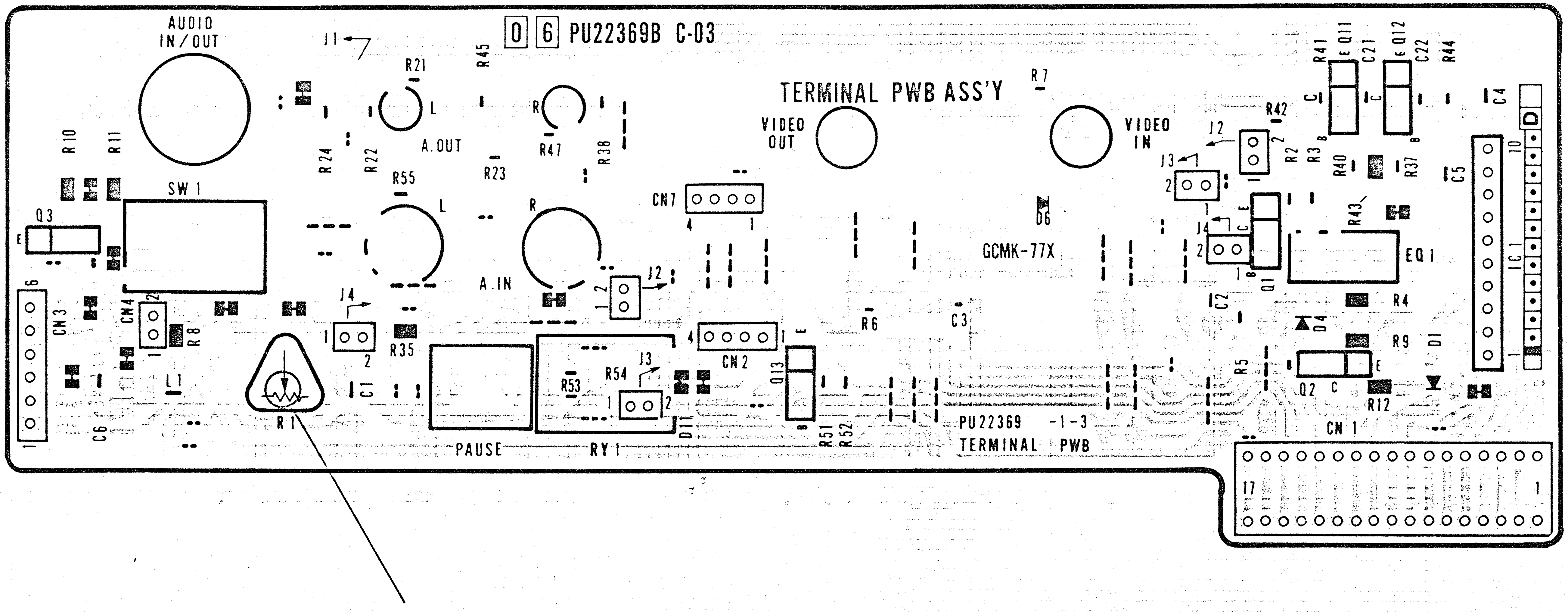

06 PU22307H L N Q-03
TERMINAL PWB ASS'Y
6
B
AUDIO IN/OUT
SW1
R24
R22
R21
A.OUT L
R45
A.OUT R
R38
R47
R55
R23
A.IN L
A.IN R
R32
R33
J2
J1
A/V IN/OUT
R7
R28
R26
R41
Q11
C21
Q12
C22
R44
C4
R42
R25
J2
R40
R37
C5
IC1
10
1
R2
Q1
R3
R43
EQ1
YEC
YE-63VN
J3
J4
CN6
C2
R5
R4
D4
R9
Q2
D7
R10
D1
CN1
16
R27
R6
C3
VPS
CN7
CN2
R31
R30
R29
D5
R35
PAUSE
RY1
J3
Q11
Q13
R51
R52
PU22307-1-3
TERMINAL PWB
CN3
C6
L1
CN4
R8
J4
C1
R1
R1
V. LOCK

3.38 TERMINAL SCHEMATIC DIAGRAM (HR-D180EK only)


06 TERMINAL
(L) IN
(R) IN
(L) OUT
(R) OUT
GND
R21 1.8K
R22 1.2K
R35 27K
R37 6.8K
Q11, Q12 : 2SC1740S(QRS)
R40 18K
R42 1K
Q12
Q11
C22 0.001
R44 6.8K
C21 0.001
R43 10K
Q3 DTA124ES
R10 10K
R11 6.8K
VIDEO OUT
VIDEO IN
R38 680
R7 75
REMOTO PAUSE
CN2
AUDIO OUT
GND
AUDIO IN
GND
From/To 09 AUDIO, CN2
CN1
V. LOCK
UNSW 12V
V. LOCK 1
V. LOCK2
R1 470K
VIDEO OUT
GND (C1)
TNR VIDEO
GND (VIDEO)
PB
INPUT SEL
SWD 12V
VIDEO IN
REMOTE PAUSE
PB 12V
TNR AUDIO
GND (AUDIO)
TV REMOTE
From/To 05 MOTHER, CN10
IC 1 10VT27
D1
C4 47/16
C5 47/16
C3 470/6.3
R6 75
R4 1K
CN3
UNSW 12V
GND
SWD 12V
VIDEO
GND
AUDIO
To RF SWITCH & MIX BOOSTER
C6 47/16
L1 100
R55 3.3K
R5 220
C1 47/16
Q1
R3 1K
R2 1K
C2 47/16
Q1 2SC1740S(QRS)

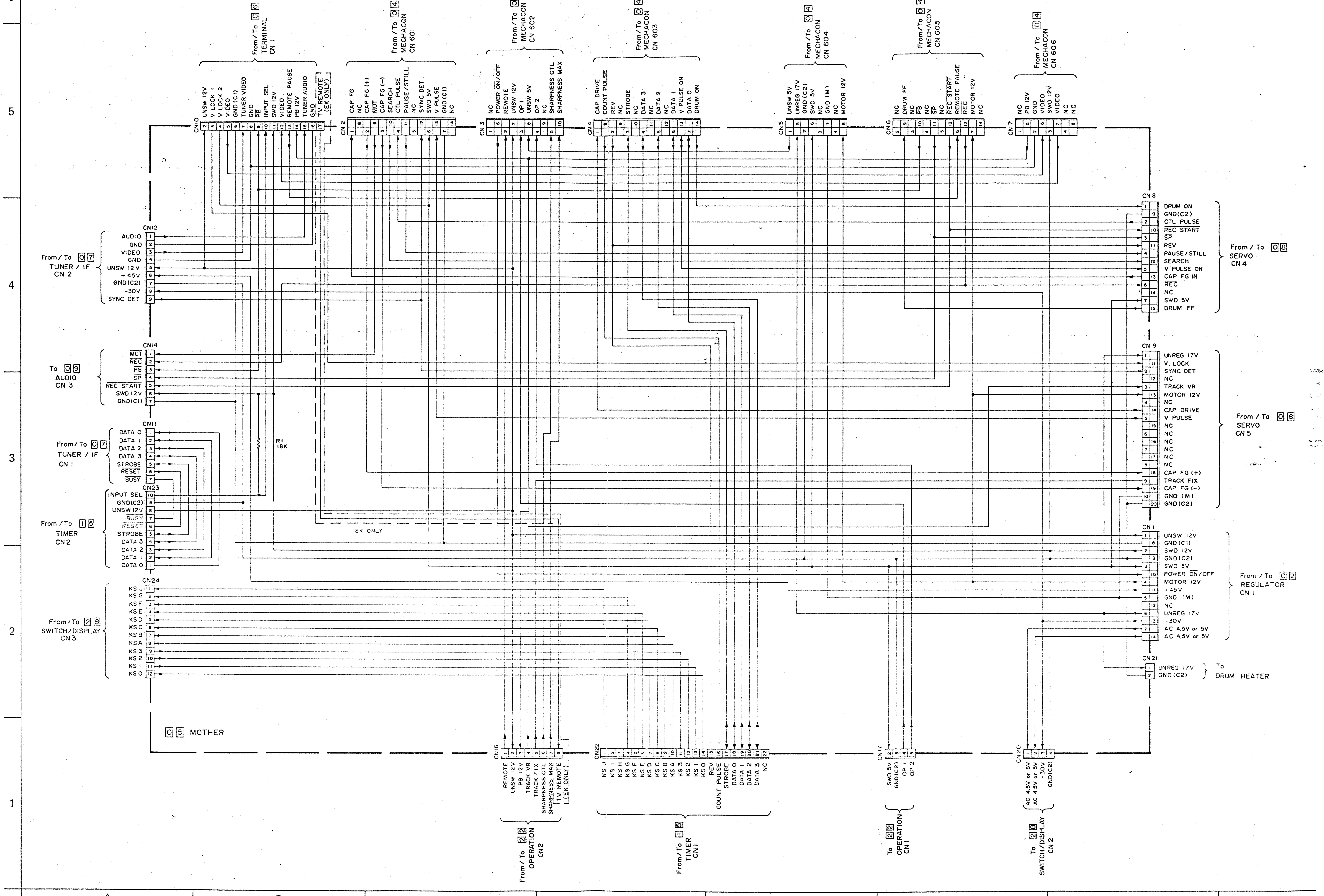
Note:
1. Voltages are DC-measured with a digital voltmeter during stop mode.

3.39 TERMINAL CIRCUIT BOARD
(HR-D180EK only)

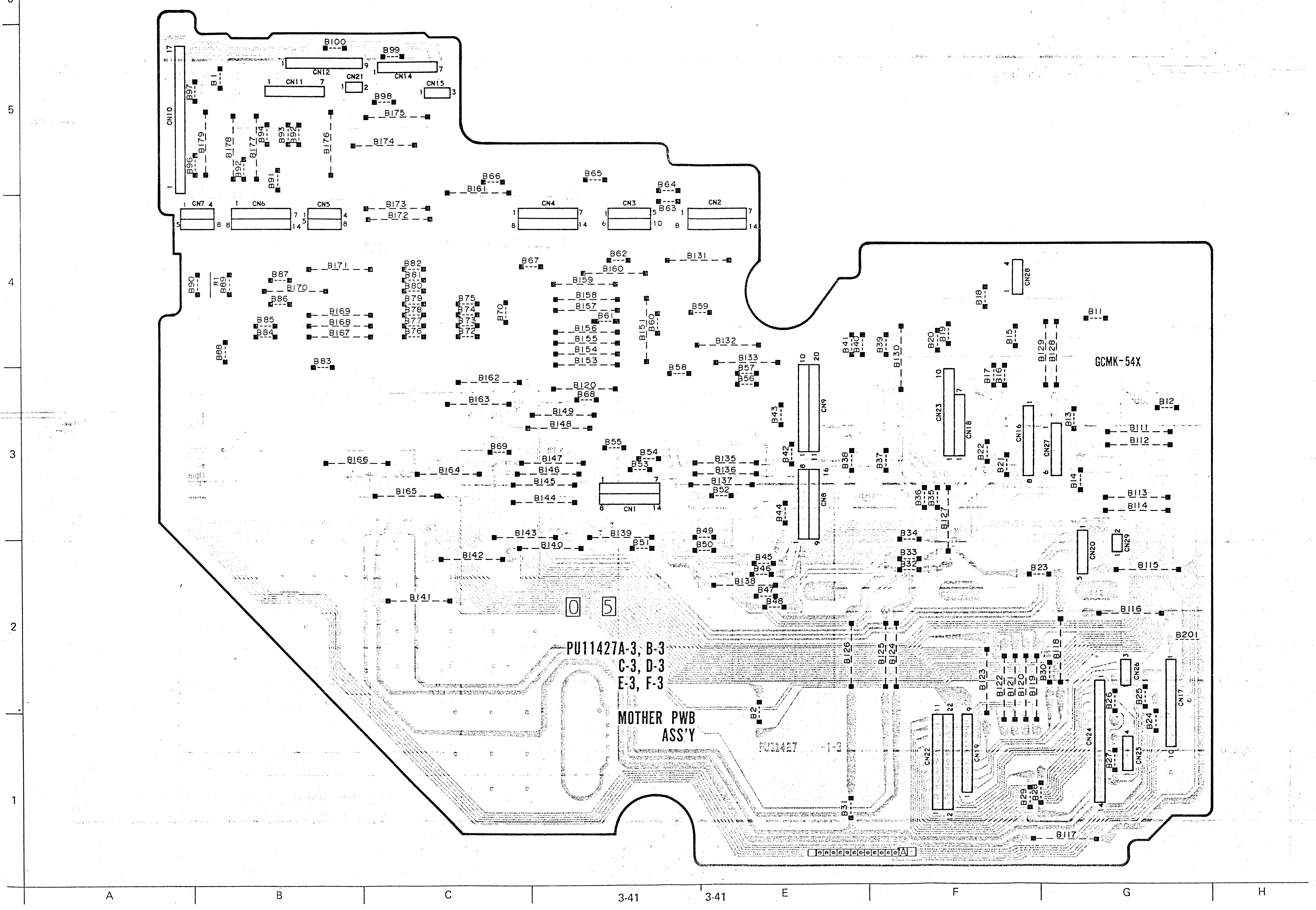

AUDIO IN/OUT
0 6 PU22369B C-03
TERMINAL PWB ASS'Y
J1
R21
R45
L
R
A.OUT
R47
R38
R24
R22
R55
R23
R10
R11
SW1
Q3
E
B
A.IN
J4
R35
C1
J2
J3
R53
R54
D11
PAUSE
RY1
CN7
CN2
Q13
R51
R52
R6
C3
R7
VIDEO OUT
VIDEO IN
D6
GCMK-77X
PU22369 -1-3
TERMINAL PWB
R41
Q11
C21
Q12
C22
R44
C4
C5
R42
R2
R3
R40
R37
R43
EQ1
Q1
C2
R4
D4
R9
D1
R5
Q2
C
R12
CN1
IC1
D
CN3
CN4
R8
L1
C6
R1
17
1
10

RI
V. LOCK

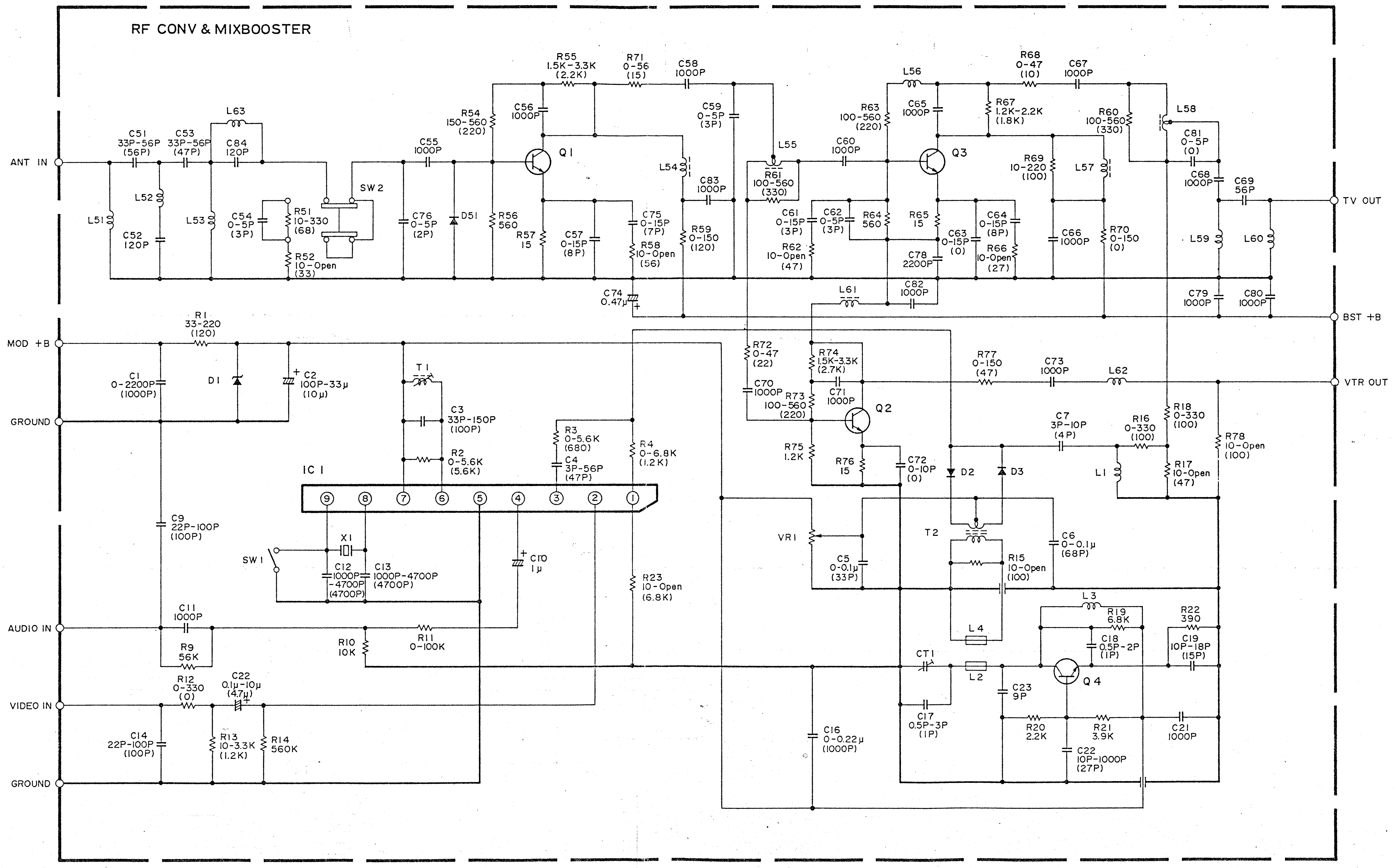
3.40 MOTHER SCHEMATIC DIAGRAM


From / To 06 TERMINAL CN 1
CN10
UNSW 12V
V LOCK 1
V LOCK 2
VIDEO
GND (C1)
TUNER VIDEO
GND
PB
INPUT SEL
SWD 12V
VIDEO
REMOTE PAUSE
PB 12V
TUNER AUDIO
GND
TV REMOTE (EK ONLY)
From / To 04 MECHACON CN 601
CN 2
CAP FG
NC
CAP FG (+)
MUT
CAP FG (−)
SEARCH
CTL PULSE
PAUSE / STILL
NC
SYNC DET
SWD 5V
V PULSE
GND (C1)
NC
From / To 04 MECHACON CN 602
CN 3
NC
POWER ON/OFF
REMOTE
UNSW 12V
OP 1
UNSW 5V
OP 2
NC
SHARPNESS CTL
SHARPNESS MAX
From / To 04 MECHACON CN 603
CN 4
CAP DRIVE
COUNT PULSE
REV
NC
STROBE
NC
DATA 3
NC
DATA 2
NC
DATA 1
V PULSE ON
DATA 0
DRUM ON
From / To 04 MECHACON CN 604
CN 5
UNSW 5V
UNREG 17V
GND (C2)
SWD 5V
NC
GND (M)
NC
MOTOR 12V
From / To 04 MECHACON CN 605
CN 6
NC
DRUM FF
NC
PB
NC
SP
NC
REC START
REMOTE PAUSE
REC
MOTOR 12V
NC
From / To 04 MECHACON CN 606
CN 7
NC
PB 12V
GND
VIDEO
SWD 12V
VIDEO
NC
NC
From / To 07 TUNER / IF CN 2
CN12
AUDIO
GND
VIDEO
GND
UNSW 12 V
+45V
GND (C2)
-30V
SYNC DET
To 09 AUDIO CN 3
CN14
MUT
REC
PB
SP
REC START
SWD 12V
GND (C1)
From / To 07 TUNER / IF CN 1
CN11
DATA 0
DATA 1
DATA 2
DATA 3
STROBE
RESET
BUSY
R1 18K
From / To 15 TIMER CN2
CN23
INPUT SEL
GND (C2)
UNSW 12V
BUSY
RESET
STROBE
DATA 3
DATA 2
DATA 1
DATA 0
EK ONLY
From / To 29 SWITCH / DISPLAY CN 3
CN24
KS J
KS G
KS F
KS E
KS D
KS C
KS B
KS A
KS 3
KS 2
KS 1
KS 0
05 MOTHER
CN 8
DRUM ON
GND (C2)
CTL PULSE
REC START
SP
REV
PAUSE / STILL
SEARCH
V PULSE ON
CAP FG IN
REC
NC
SWD 5V
DRUM FF
From / To 08 SERVO CN 4
CN 9
UNREG 17V
V. LOCK
SYNC DET
NC
TRACK VR
MOTOR 12V
NC
CAP DRIVE
V PULSE
NC
NC
NC
NC
NC
NC
CAP FG (+)
TRACK FIX
CAP FG (−)
GND (M)
GND (C2)
From / To 08 SERVO CN 5
CN 1
UNSW 12V
GND (C1)
SWD 12V
GND (C2)
SWD 5V
POWER ON/OFF
MOTOR 12V
+45V
GND (M)
NC
UNREG 17V
-30V
AC 4.5V or 5V
AC 4.5V or 5V
From / To 02 REGULATOR CN 1
CN 21
UNREG 17V
GND (C2)
To DRUM HEATER
CN16
REMOTE
UNSW 12V
PB 12V
TRACK VR
TRACK FIX
SHARPNESS CTL
SHARPNESS MAX
TV REMOTE (EK ONLY)
From / To 22 OPERATION CN2
CN22
KS J
KS I
KS H
KS G
KS F
KS E
KS D
KS C
KS B
KS A
KS 3
KS 2
KS 1
KS 0
REV
COUNT PULSE
STROBE
DATA 0
DATA 1
DATA 2
DATA 3
NC
From / To 15 TIMER CN1
CN17
SWD 5V
GND (C2)
OP 1
OP 2
To 22 OPERATION CN1
CN20
AC 4.5V or 5V
AC 4.5V or 5V
-30V
GND (C2)
To 28 SWITCH / DISPLAY CN 2
1
2
3
4
5
6
A
B
C
D
E
F
G
H

3.41 MOTHER CIRCUIT BOARD

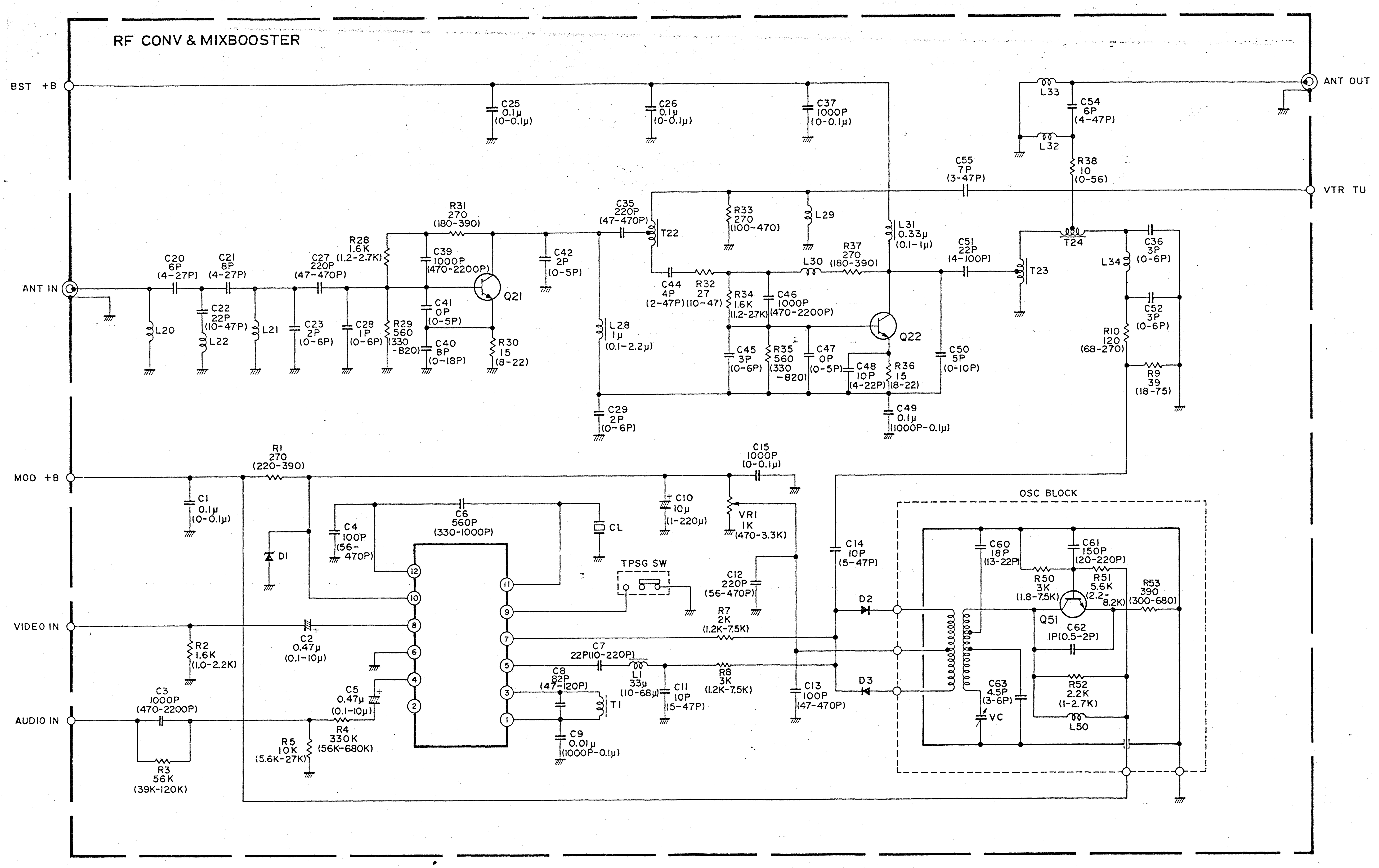

PU11427A-3, B-3
C-3, D-3
E-3, F-3
MOTHER PWB
ASS'Y
GCMK-54X
PU11427 -1-3
0
5
CN1
CN2
CN3
CN4
CN5
CN6
CN7
CN8
CN9
CN10
CN11
CN12
CN14
CN15
CN16
CN17
CN18
CN19
CN20
CN21
CN22
CN23
CN24
CN25
CN26
CN27
CN28
CN29
R1
B1
B2
B11
B12
B13
B14
B15
B16
B17
B18
B19
B20
B21
B22
B23
B24
B25
B26
B27
B28
B29
B30
B31
B32
B33
B34
B35
B36
B37
B38
B39
B40
B41
B42
B43
B44
B45
B46
B47
B48
B49
B50
B51
B52
B53
B54
B55
B56
B57
B58
B59
B60
B61
B62
B63
B64
B65
B66
B67
B68
B69
B70
B72
B73
B74
B75
B76
B77
B78
B79
B80
B81
B82
B83
B84
B85
B86
B87
B88
B89
B90
B91
B92
B93
B94
B96
B97
B98
B99
B100
B111
B112
B113
B114
B115
B116
B117
B118
B119
B120
B121
B122
B123
B124
B125
B126
B127
B128
B129
B130
B131
B132
B133
B135
B136
B137
B138
B139
B140
B141
B142
B143
B144
B145
B146
B147
B148
B149
B151
B153
B154
B155
B156
B157
B158
B159
B160
B161
B162
B163
B164
B165
B166
B167
B168
B169
B170
B171
B172
B173
B174
B175
B176
B177
B178
B179
B201
A
B
C
E
F
G
H
1
2
3
4
5
6

3.42 RF CONVERTER & MIX BOOSTER
(HR-D180E/EG only)


RF CONV & MIXBOOSTER
ANT IN
MOD +B
GROUND
AUDIO IN
VIDEO IN
GROUND
TV OUT
BST +B
VTR OUT
C51 33P-56P (56P)
C53 33P-56P (47P)
L63
C84 120P
L51
L52
C52 120P
L53
C54 0-5P (3P)
R51 10-330 (68)
R52 10-Open (33)
SW2
C55 1000P
C76 0-5P (2P)
D51
R54 150-560 (220)
R56 560
C56 1000P
R55 1.5K-3.3K (2.2K)
R71 0-56 (15)
C58 1000P
Q1
R57 15
C57 0-15P (8P)
C75 0-15P (7P)
R58 10-Open (56)
L54
C59 0-5P (3P)
C83 1000P
R59 0-150 (120)
C74 0.47μ
L55
R61 100-560 (330)
C60 1000P
R63 100-560 (220)
C65 1000P
L56
Q3
C61 0-15P (3P)
C62 0-5P (3P)
R62 10-Open (47)
R64 560
R65 15
C63 0-15P (0)
C78 2200P
C64 0-15P (8P)
R66 10-Open (27)
C82 1000P
L61
R68 0-47 (10)
C67 1000P
R67 1.2K-2.2K (1.8K)
R60 100-560 (330)
L58
R69 10-220 (100)
L57
C66 1000P
R70 0-150 (0)
C81 0-5P (0)
C68 1000P
C69 56P
L59
L60
C79 1000P
C80 1000P
R1 33-220 (120)
C1 0-2200P (1000P)
D1
C2 100P-33μ (10μ)
T1
C3 33P-150P (100P)
R2 0-5.6K (5.6K)
R3 0-5.6K (680)
C4 3P-56P (47P)
R4 0-6.8K (1.2K)
IC1
9 8 7 6 5 4 3 2 1
C9 22P-100P (100P)
X1
SW1
C12 1000P -4700P (4700P)
C13 1000P-4700P (4700P)
C10 1μ
R23 10-Open (6.8K)
C11 1000P
R9 56K
R10 10K
R11 0-100K
R12 0-330 (0)
C22 0.1μ-10μ (4.7μ)
C14 22P-100P (100P)
R13 10-3.3K (1.2K)
R14 560K
R72 0-47 (22)
C70 1000P
R74 1.5K-3.3K (2.7K)
C71 1000P
R73 100-560 (220)
Q2
R75 1.2K
R76 15
C72 0-10P (0)
D2
D3
R77 0-150 (47)
C73 1000P
L62
C7 3P-10P (4P)
R16 0-330 (100)
R18 0-330 (100)
R17 10-Open (47)
L1
R78 10-Open (100)
VR1
T2
C5 0-0.1μ (33P)
C6 0-0.1μ (68P)
R15 10-Open (100)
L3
R19 6.8K
C18 0.5P-2P (1P)
R22 390
C19 10P-18P (15P)
L4
CT1
L2
Q4
C23 9P
C17 0.5P-3P (1P)
R20 2.2K
R21 3.9K
C21 1000P
C22 10P-1000P (27P)
C16 0-0.22μ (1000P)

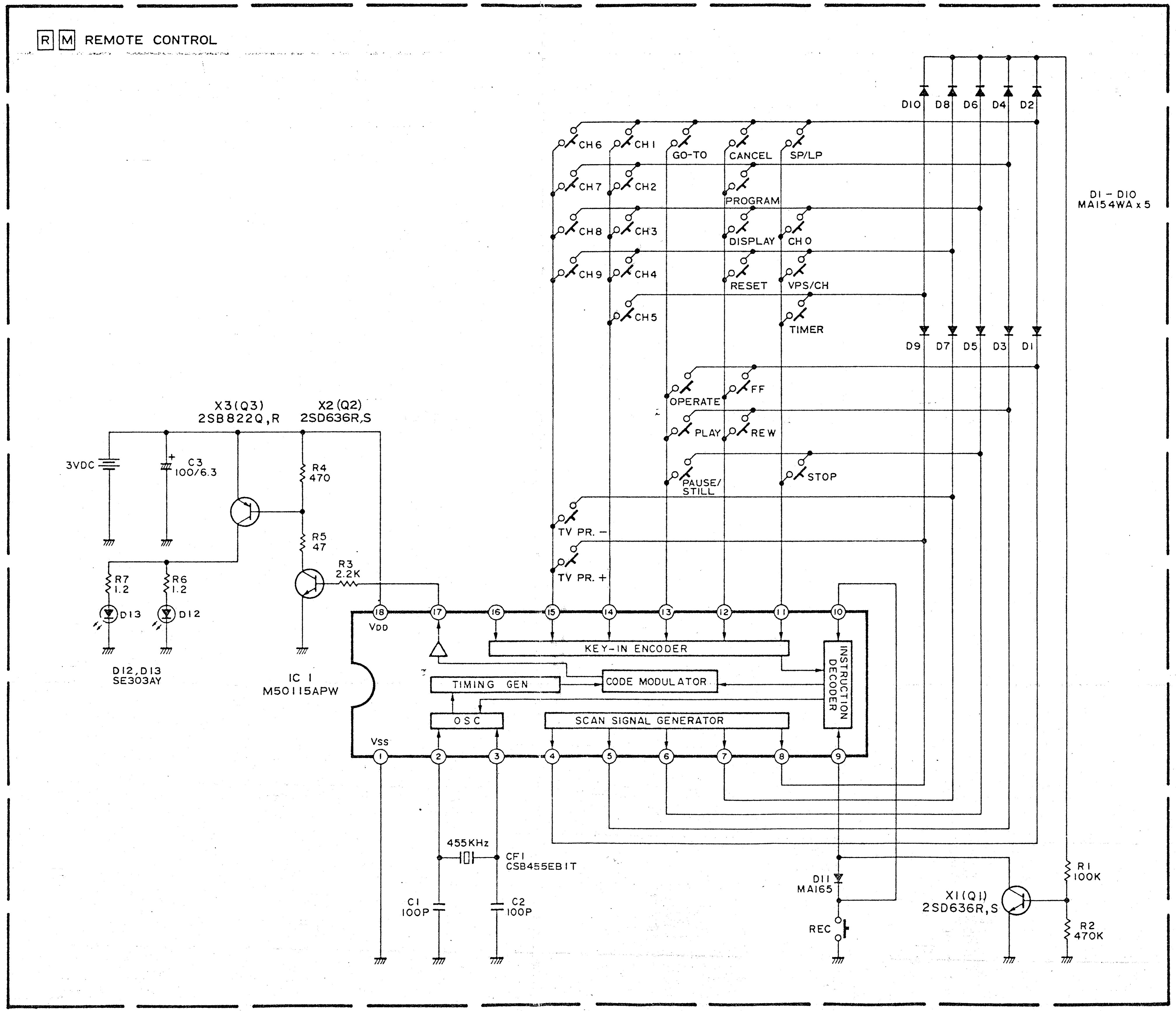
NOTE: This schematic parts are critical for sefety.
Replace only with specified part numbers.

3.43 RF CONVERTER & MIXBOOSTER
(HR-D180EK only)


RF CONV & MIXBOOSTER
BST +B
ANT IN
MOD +B
VIDEO IN
AUDIO IN
ANT OUT
VTR TU
C25 0.1μ (0-0.1μ)
C26 0.1μ (0-0.1μ)
C37 1000P (0-0.1μ)
L33
C54 6P (4-47P)
L32
R38 10 (0-56)
C55 7P (3-47P)
R31 270 (180-390)
C35 220P (47-470P)
T22
R33 270 (100-470)
L29
L31 0.33μ (0.1-1μ)
R28 1.6K (1.2-2.7K)
C39 1000P (470-2200P)
C42 2P (0-5P)
R37 270 (180-390)
L30
C51 22P (4-100P)
T24
C36 3P (0-6P)
L34
T23
C20 6P (4-27P)
C21 8P (4-27P)
C27 220P (47-470P)
Q21
C44 4P (2-47P)
R32 27 (10-47)
R34 1.6K (1.2-27K)
C46 1000P (470-2200P)
C52 3P (0-6P)
C41 0P (0-5P)
L20
C22 22P (10-47P)
L22
L21
C23 2P (0-6P)
C28 1P (0-6P)
R29 560 (330-820)
C40 8P (0-18P)
R30 15 (8-22)
L28 1μ (0.1-2.2μ)
Q22
R10 120 (68-270)
C45 3P (0-6P)
R35 560 (330-820)
C47 0P (0-5P)
C48 10P (4-22P)
R36 15 (8-22)
C50 5P (0-10P)
R9 39 (18-75)
C29 2P (0-6P)
C49 0.1μ (1000P-0.1μ)
R1 270 (220-390)
C15 1000P (0-0.1μ)
C1 0.1μ (0-0.1μ)
C6 560P (330-1000P)
C10 10μ (1-220μ)
VR1 1K (470-3.3K)
C4 100P (56-470P)
CL
D1
C14 10P (5-47P)
OSC BLOCK
TPSG SW
C12 220P (56-470P)
C60 18P (13-22P)
C61 150P (20-220P)
R50 3K (1.8-7.5K)
R51 5.6K (2.2-8.2K)
R53 390 (300-680)
D2
R7 2K (1.2K-7.5K)
Q51
C62 1P(0.5-2P)
R2 1.6K (1.0-2.2K)
C2 0.47μ (0.1-10μ)
C7 22P(10-220P)
C8 82P (47-120P)
L1 33μ (10-68μ)
R8 3K (1.2K-7.5K)
D3
C63 4.5P (3-6P)
R52 2.2K (1-2.7K)
C3 1000P (470-2200P)
C5 0.47μ (0.1-10μ)
C11 10P (5-47P)
C13 100P (47-470P)
T1
VC
L50
R4 330K (56K-680K)
R5 10K (5.6K-27K)
C9 0.01μ (1000P-0.1μ)
R3 56K (39K-120K)
12
11
10
9
8
7
6
5
4
3
2
1

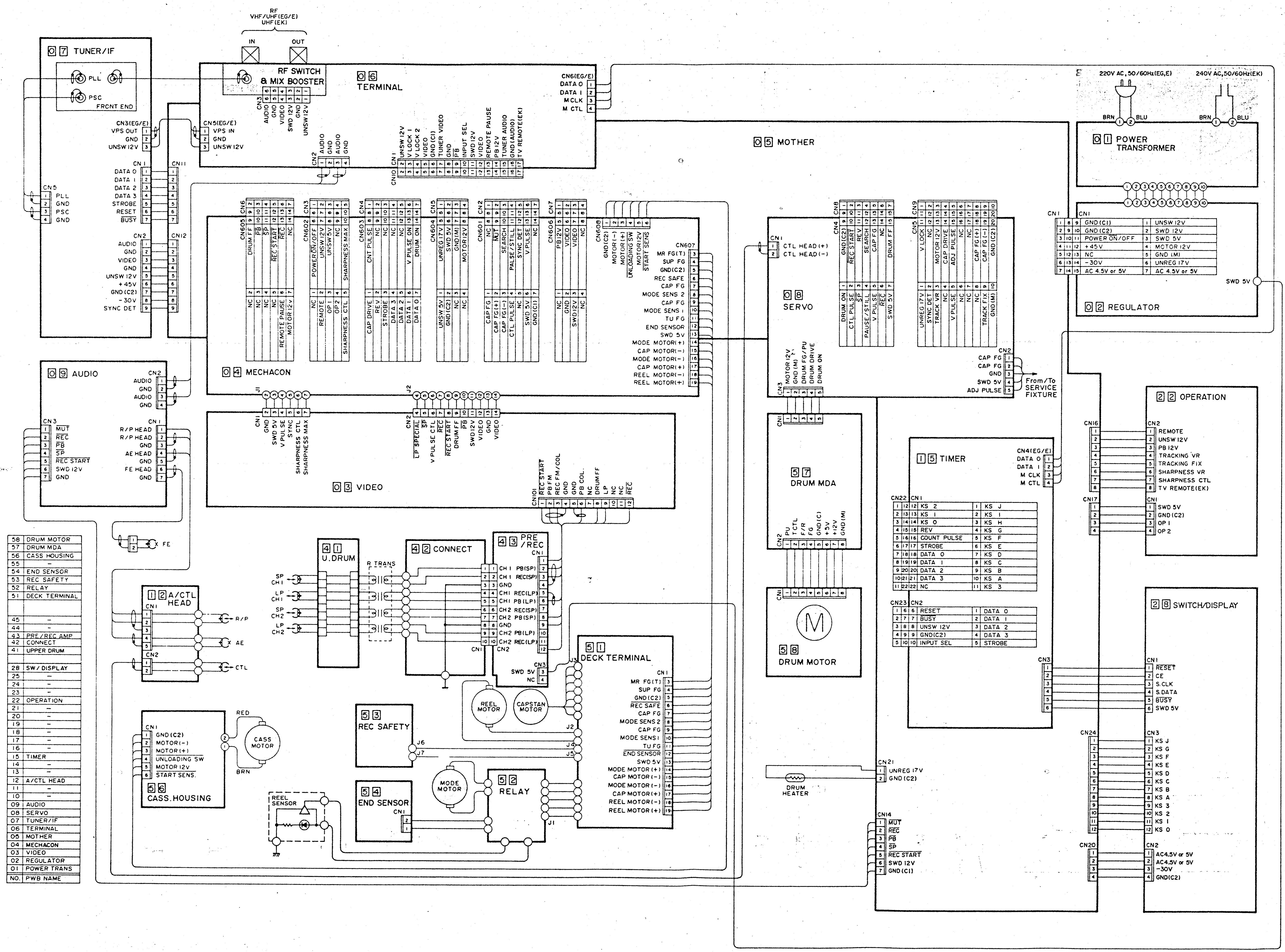
NOTE: This schematic parts are critical for sefety.
Replace only with specified part numbers.

3.44 REMOTE CONTROL SCHEMATIC DIAGRAM


R M REMOTE CONTROL
D10 D8 D6 D4 D2
D9 D7 D5 D3 D1
D1 – D10
MA154WA x 5
CH6
CH1
GO-TO
CANCEL
SP/LP
CH7
CH2
PROGRAM
CH8
CH3
DISPLAY
CH 0
CH9
CH4
RESET
VPS/CH
CH5
TIMER
OPERATE
FF
PLAY
REW
PAUSE/STILL
STOP
TV PR. –
TV PR. +
X3 (Q3)
2SB822Q,R
X2 (Q2)
2SD636R,S
3VDC
C3
100/6.3
R4
470
R5
47
R3
2.2K
R7
1.2
R6
1.2
D13
D12
D12, D13
SE303AY
IC 1
M50115APW
VDD
VSS
KEY-IN ENCODER
INSTRUCTION DECODER
TIMING GEN
CODE MODULATOR
OSC
SCAN SIGNAL GENERATOR
455KHz
CF1
CSB455EBIT
C1
100P
C2
100P
D11
MA165
REC
X1 (Q1)
2SD636R,S
R1
100K
R2
470K

NOTE: This schematic parts are critical for sefety. Replace only with specified part numbers.

3.45 OVERALL WIRNG DIAGRAM

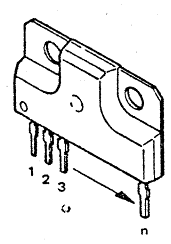


RF
VHF/UHF(EG/E)
UHF(EK)
IN
OUT
07 TUNER/IF
PLL
PSC
FRONT END
RF SWITCH & MIX BOOSTER
06 TERMINAL
CN6(EG/E) DATA 0 DATA 1 M CLK M CTL
CN3(EG/E) VPS OUT GND UNSW 12V
CN5(EG/E) VPS IN GND UNSW 12V
CN1 DATA 0 DATA 1 DATA 2 DATA 3 STROBE RESET BUSY
CN2 AUDIO GND VIDEO GND UNSW 12V +45V GND(C2) -30V SYNC DET
CN5 PLL GND PSC GND
CN11
CN12
CN10 CN1 UNSW 12V V LOCK 1 V LOCK 2 VIDEO GND(C1) TUNER VIDEO GND PB INPUT SEL SWD12V VIDEO REMOTE PAUSE PB 12V TUNER AUDIO GND(AUDIO) TV REMOTE(EK)
05 MOTHER
220V AC, 50/60Hz(EG,E)
240V AC, 50/60Hz(EK)
BRN
BLU
01 POWER TRANSFORMER
02 REGULATOR
CN1 GND(C1) GND(C2) POWER ON/OFF +45V NC -30V AC 4.5V or 5V UNSW 12V SWD 12V SWD 5V MOTOR 12V GND(M) UNREG 17V AC 4.5V or 5V
SWD 5V
04 MECHACON
CN603 CN602 CN604 CN601 CN606 CN608 CN607
MR FG(T) SUP FG GND(C2) REC SAFE CAP FG MODE SENS 2 CAP FG MODE SENS 1 TU FG END SENSOR SWD 5V MODE MOTOR(+) CAP MOTOR(-) MODE MOTOR(-) CAP MOTOR(+) REEL MOTOR(-) REEL MOTOR(+)
09 AUDIO
CN2 AUDIO GND AUDIO GND
CN3 MUT REC PB SP REC START SWD 12V GND
CN1 R/P HEAD R/P HEAD GND AE HEAD GND FE HEAD GND
FE
03 VIDEO
J1 J2
CN101 REC START PBFM REC FM/COL GND PB COL. NC DRUM FF LP NC NC REC
08 SERVO
CN1 CTL HEAD(+) CTL HEAD(-)
CN8 CN4 CN9 CN5
CN2 CAP FG CAP FG GND SWD 5V ADJ PULSE
From/To SERVICE FIXTURE
CN3 MOTOR 12V GND(M) DRUM FG/PU DRUM DRIVE DRUM ON
57 DRUM MDA
CN2 PU CTL F/R FG GND(C) +5V +12V GND(M)
58 DRUM MOTOR
M
15 TIMER
CN4(EG/E) DATA 0 DATA 1 M CLK M CTL
CN22 CN1 KS 2 KS 1 KS 0 REV COUNT PULSE STROBE DATA 0 DATA 1 DATA 2 DATA 3 NC KS J KS I KS H KS G KS F KS E KS D KS C KS B KS A KS 3
CN23 CN2 RESET BUSY UNSW 12V GND(C2) INPUT SEL DATA 0 DATA 1 DATA 2 DATA 3 STROBE
22 OPERATION
CN16 CN2 REMOTE UNSW 12V PB 12V TRACKING VR TRACKING FIX SHARPNESS VR SHARPNESS CTL TV REMOTE(EK)
CN17 CN1 SWD 5V GND(C2) OP 1 OP 2
28 SWITCH/DISPLAY
CN3 CN1 RESET CE S.CLK S.DATA BUSY SWD 5V
CN24 CN3 KS J KS G KS F KS E KS D KS C KS B KS A KS 3 KS 2 KS 1 KS 0
CN20 CN2 AC4.5V or 5V AC4.5V or 5V -30V GND(C2)
CN21 UNREG 17V GND(C2)
DRUM HEATER
CN14 MUT REC PB SP REC START SWD 12V GND(C1)
12 A/CTL HEAD
R/P
AE
CTL
41 U.DRUM
SP CH1
LP CH1
SP CH2
LP CH2
R TRANS
42 CONNECT
43 PRE/REC
CH1 PB(SP) CH1 REC(SP) GND CH1 REC(LP) CH1 PB(LP) CH2 REC(SP) CH2 PB(SP) GND CH2 PB(LP) CH2 REC(LP)
CN3 SWD 5V NC
51 DECK TERMINAL
REEL MOTOR
CAPSTAN MOTOR
RED
BRN
CASS MOTOR
56 CASS.HOUSING
CN1 GND(C2) MOTOR(-) MOTOR(+) UNLOADING SW MOTOR 12V START SENS.
53 REC SAFETY
54 END SENSOR
REEL SENSOR
MODE MOTOR
52 RELAY
J1 J2 J3 J4 J5 J6 J7

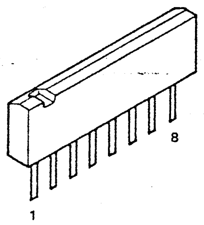
NO.	PWB NAME
58	DRUM MOTOR
57	DRUM MDA
56	CASS HOUSING
55	–
54	END SENSOR
53	REC SAFETY
52	RELAY
51	DECK TERMINAL
45	–
44	–
43	PRE/REC AMP
42	CONNECT
41	UPPER DRUM
28	SW/DISPLAY
25	–
24	–
23	–
22	OPERATION
21	–
20	–
19	–
18	–
17	–
16	–
15	TIMER
14	–
13	–
12	A/CTL HEAD
11	–
10	–
09	AUDIO
08	SERVO
07	TUNER/IF
06	TERMINAL
05	MOTHER
04	MECHACON
03	VIDEO
02	REGULATOR
01	POWER TRANS

3.46 SEMICONDUCTOR SHAPES

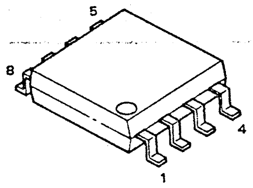
M54644BL
M54644AL



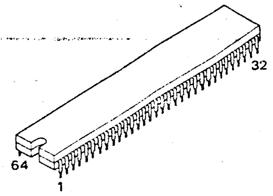
BA7007



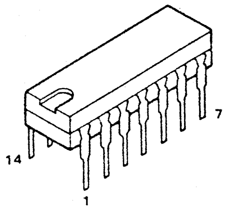
UPC339G2
UPC324G2
UPD4013BG



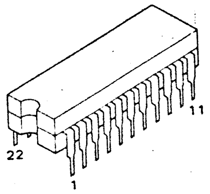
UPD75208CW-024
UPD75208CW-030
M50965-612SP



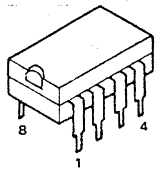
M51796P
M58655P
BU4066BP



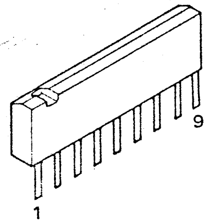
AN3592K



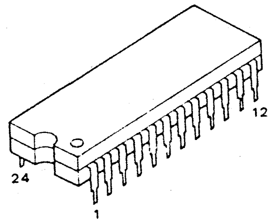
MSM6989RS



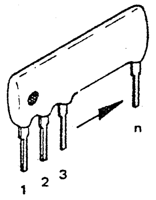
BA7021



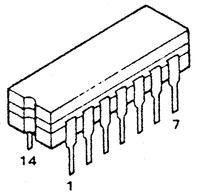
AN3994K
UPD82C43CY



10VT27



UPC324C



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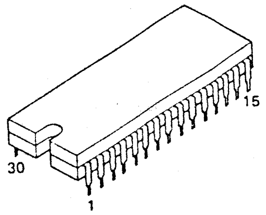
M51365SP
HA11870NT



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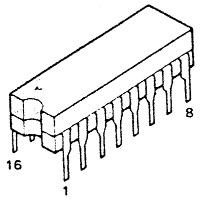

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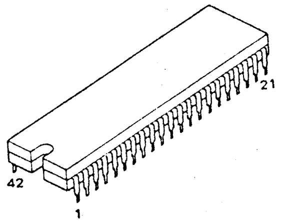
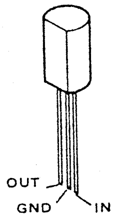
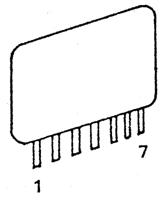


S-8053HLB
M5278L56



7VT12



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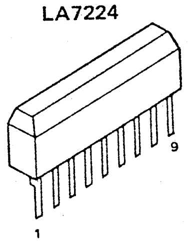
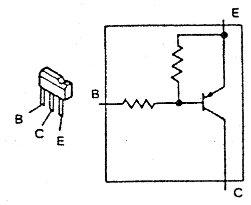
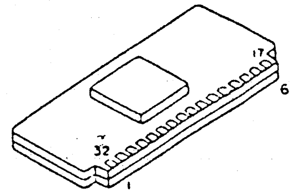
LA7224



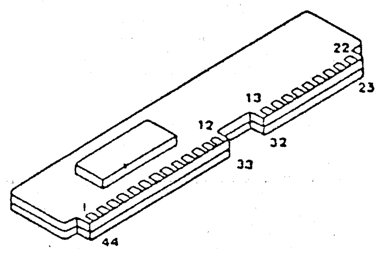
DTA114
DTA124
DTA144



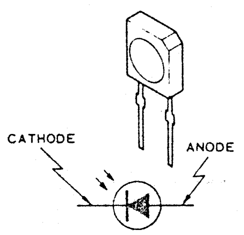
PU22046A



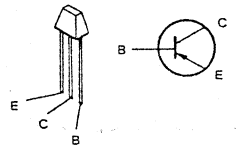
PU22282A


22
23
13
12
32
33
1
44

PD49PI


CATHODE
ANODE

2SA933
2SB1030
2SA1309



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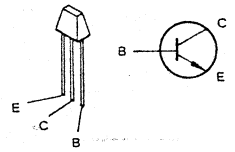
2SC3311
1SC3354



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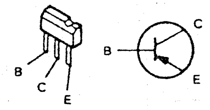
2SB643



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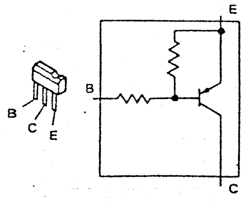
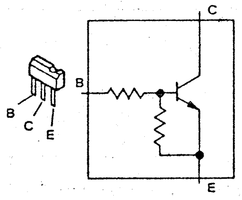
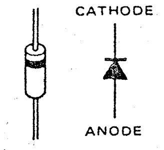
DTA144



DTC144
DTC124

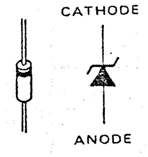


S5688G-TPA3
MA150
11E2
1SS132
MA27WA
10E2
1SS133
MA165
OA90

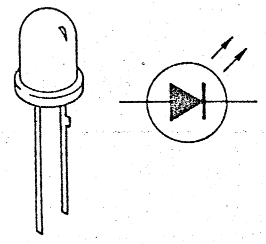

CATHODE
ANODE

HZ30-2
HZS4.7EB2
HZS7.5EB2
HZS9.1EB1
HZS6.8EB2
HZS5.6EB1
HZ7B

MTZ10B
MTZ7.5B
MTZ12B
MTZ5.1B
RD9.1ES-T1B2
RD8.2EB2
RD5.1ES-T1B1


CATHODE
ANODE

SLR-34VC3F



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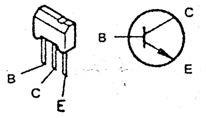
2SC2021



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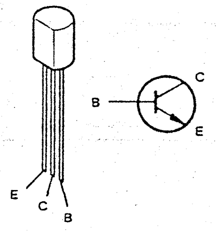
2SC1685
2SC1317



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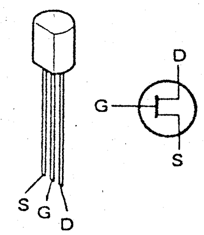
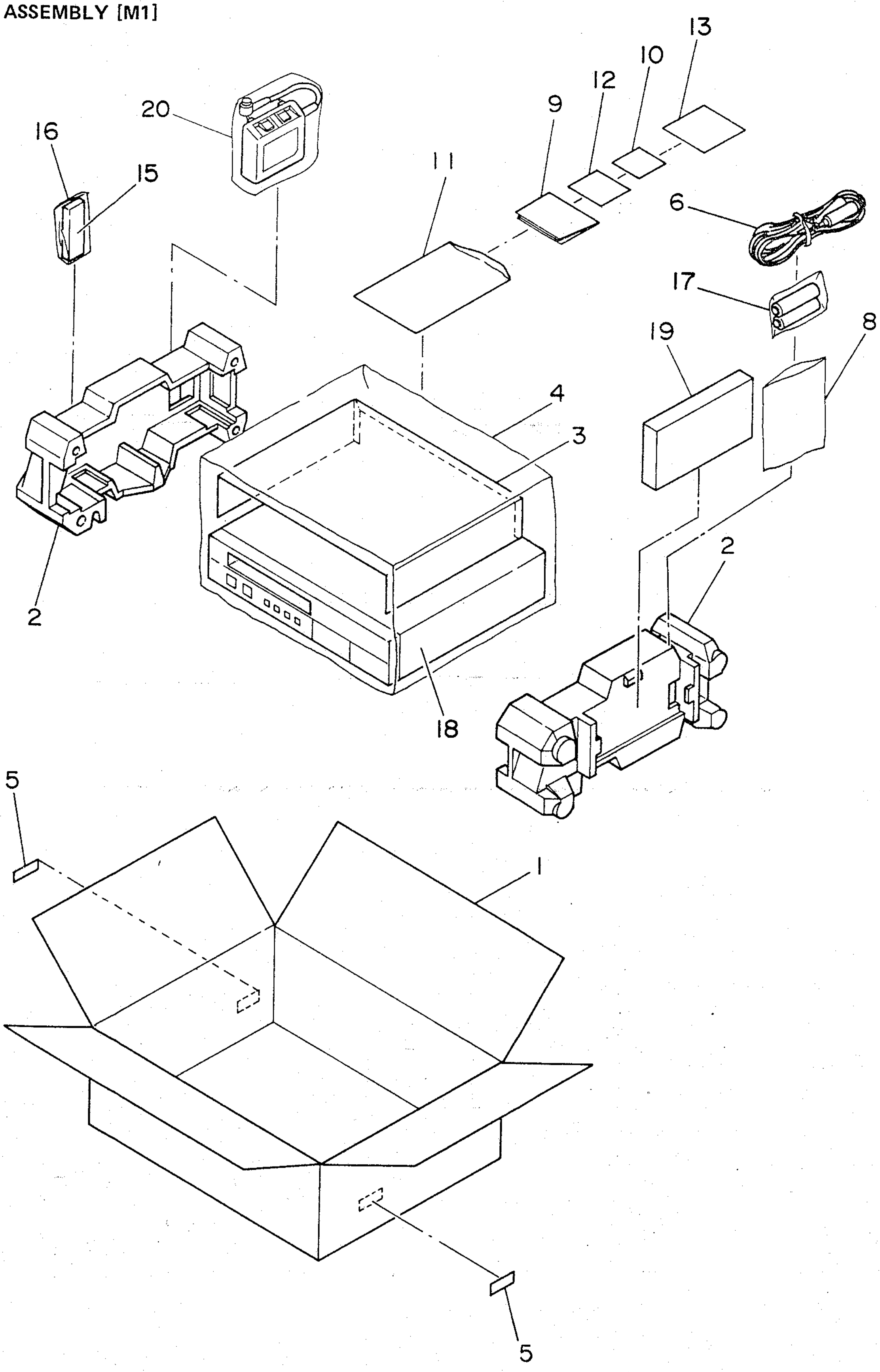
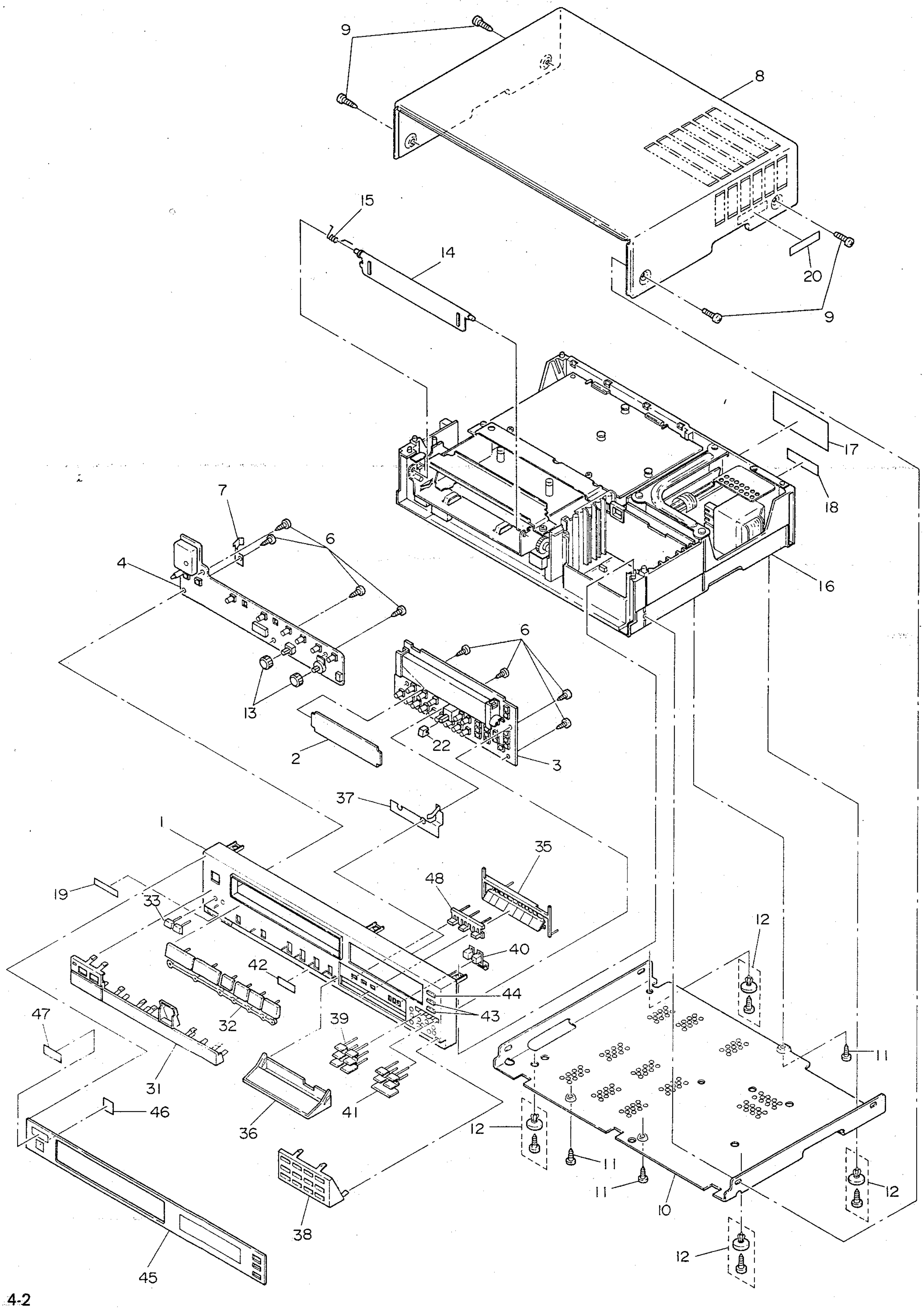


SECTION 4
EXPLODED VIEWS

4.1 PACKING ASSEMBLY [M1]


13
10
12
9
20
16
15
11
6
17
8
19
4
3
2
2
18
5
1
5

4.2 CABINET ASSEMBLY [M2]



9
8
15
14
20
9
17
18
7
6
4
16
6
13
22
2
3
37
1
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48
19
33
12
40
42
44
43
47
39
32
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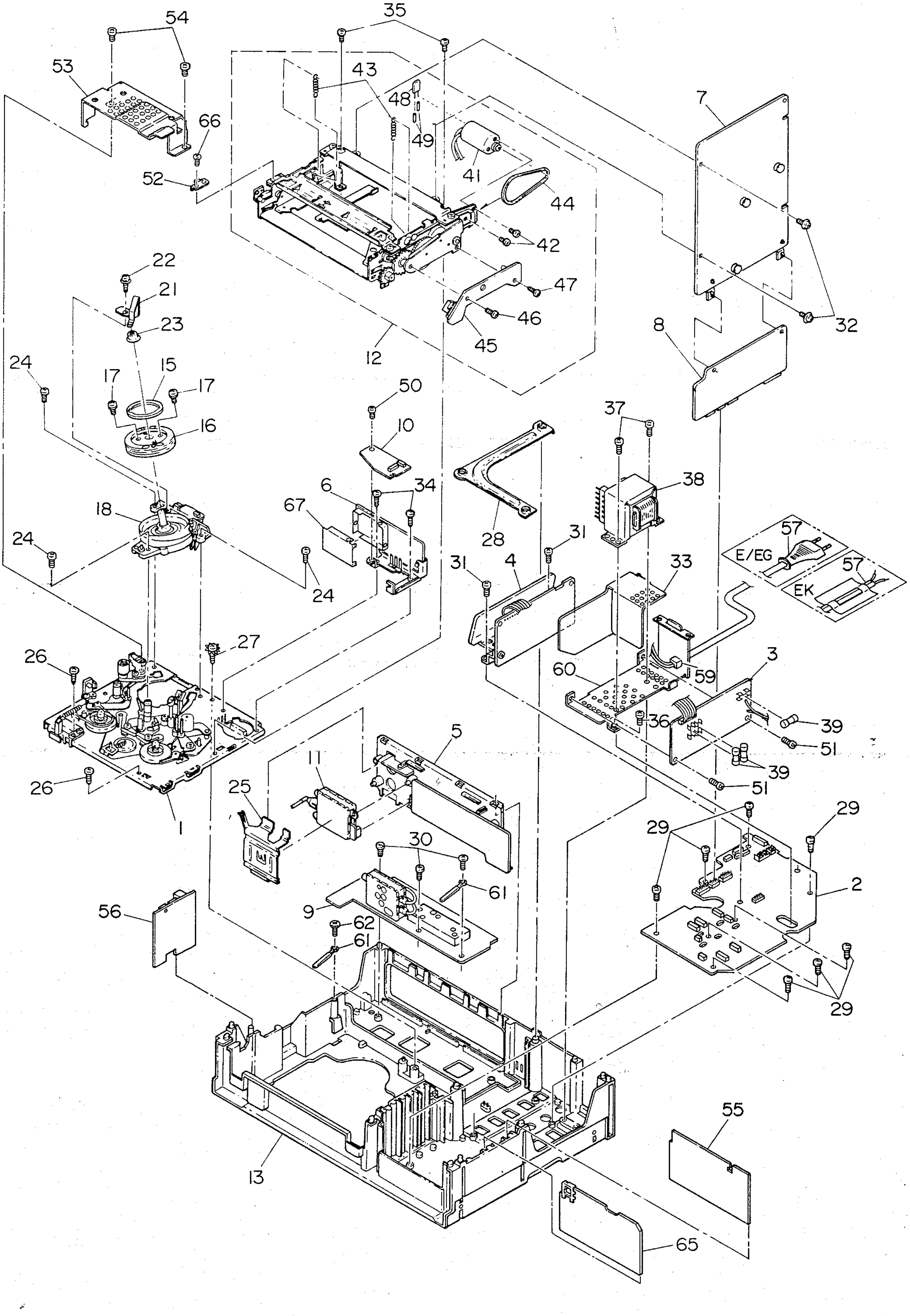
31
41
46
36
12
11
11
12
10
38
12
45

4.3 CHASSIS ASSEMBLY [M3]


54
35
53
43
48
66
49
7
52
41
44
42
47
22
21
46
32
23
45
24
15
17
17
12
8
16
50
37
10
34
6
38
67
18
57
E/EG
57
EK
24
31
31
4
33
24
27
3
26
60
59
39
36
5
51
11
39
25
26
51
1
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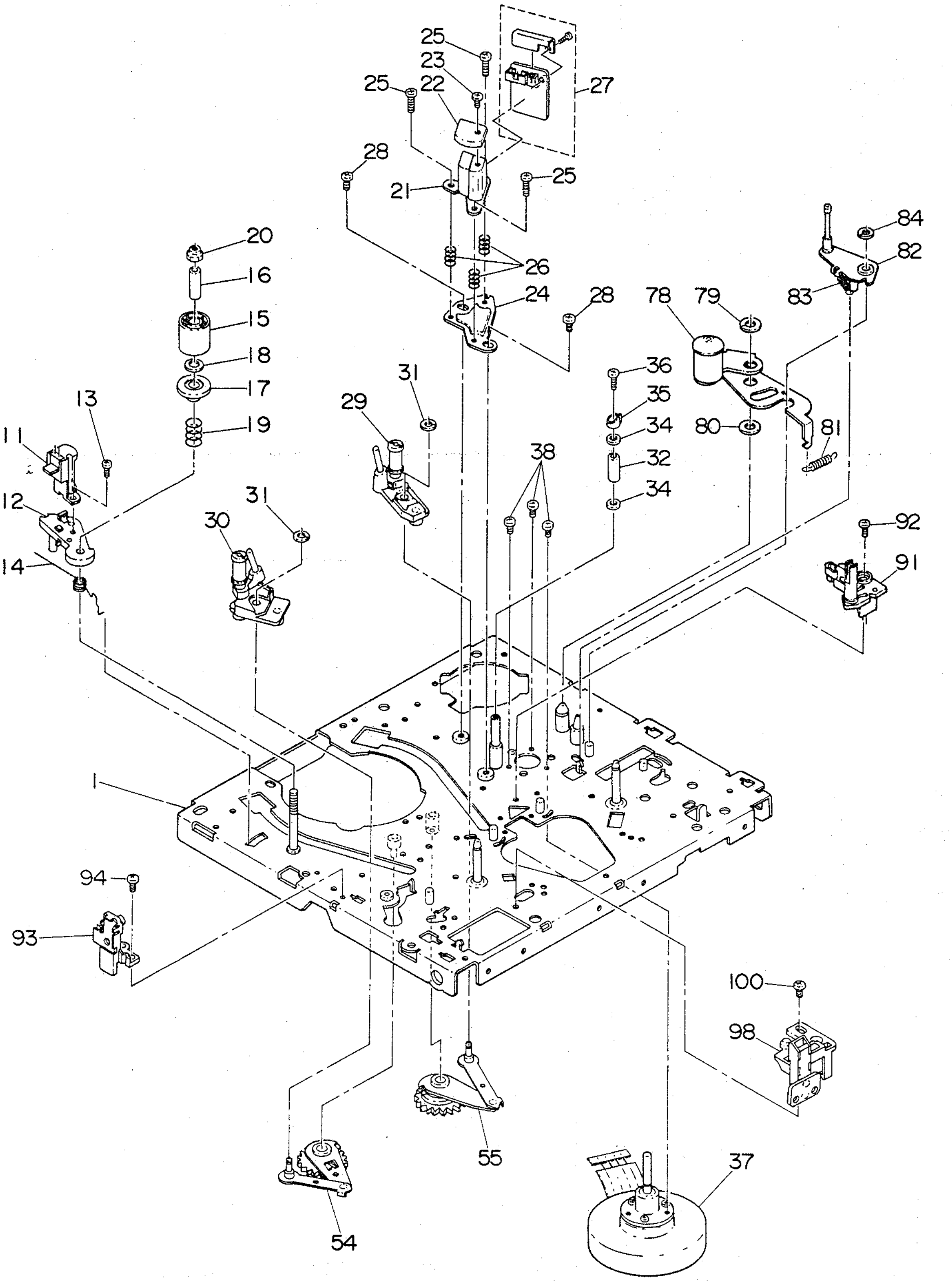
2
61
56
9
62
61
29
55
13
65

4.4 MECHANISM ASSEMBLY [M4] -1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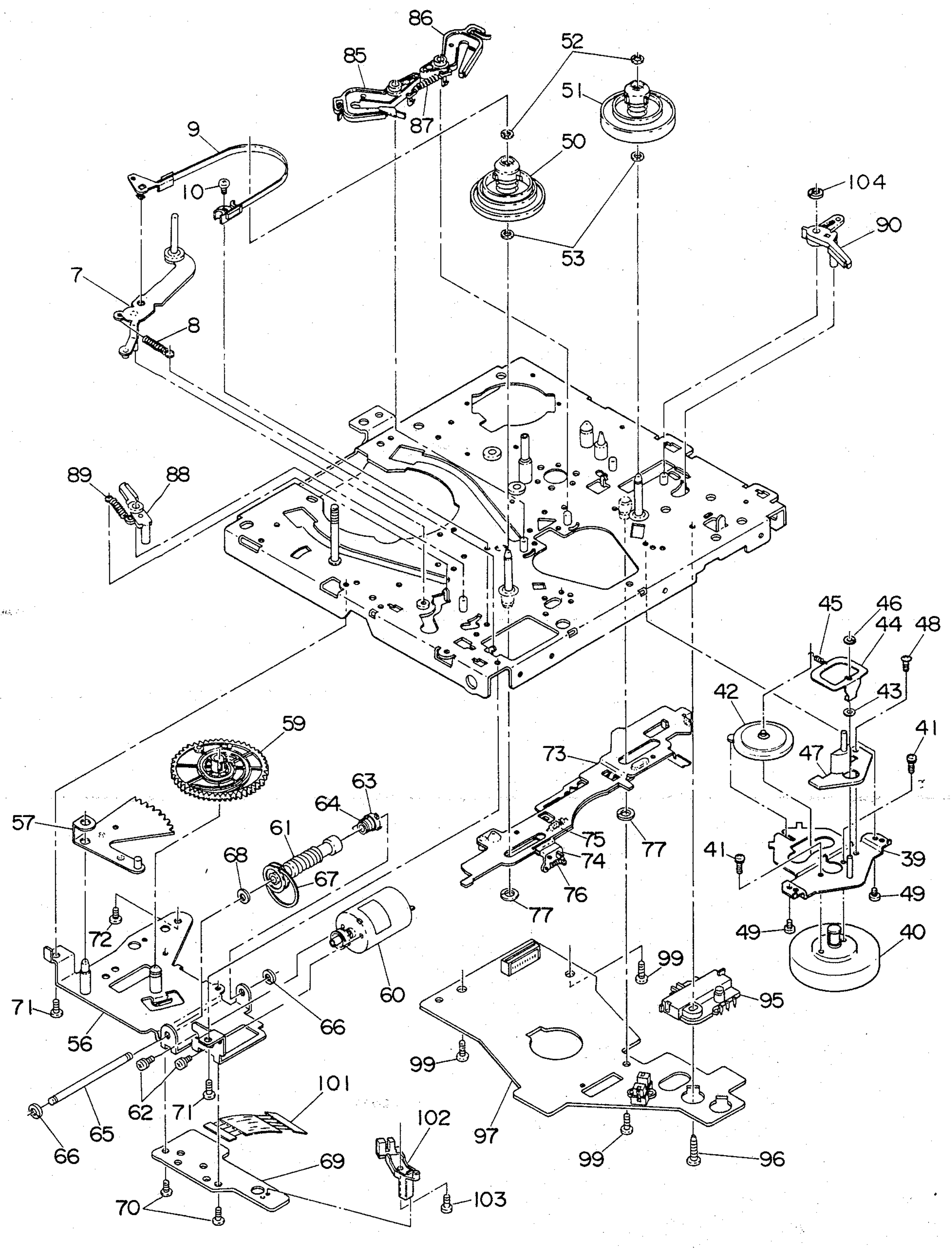
84
82
16
26
24
28
78
79
83
15
18
17
31
36
35
13
29
34
80
81
11
19
38
32
34
12
31
92
30
91
14
1
94
93
100
98
55
37
54

MECHANISM ASSEMBLY [M4]-2



86
52
85
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87
9
50
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104
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48
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73
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67
76
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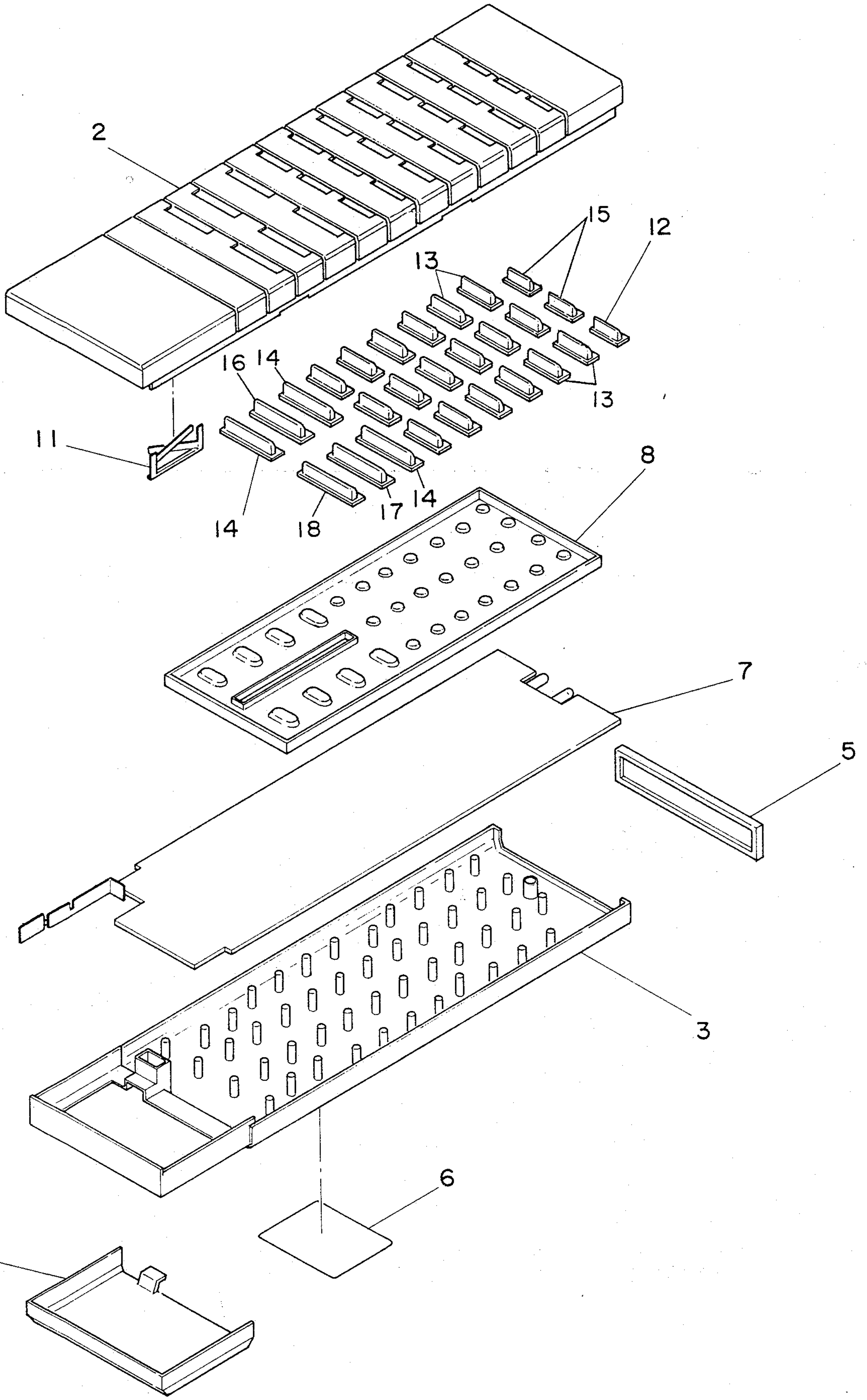
49
40
72
99
60
95
71
66
56
99
101
62
71
102
65
97
66
69
99
96
103
70

4.5 REMOTE CONTROL UNIT [M5]


2
15
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16
14
13
11
8
14
17
14
18
7
5
3
6
4

SECTION 5
PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

RESISTORS— All resistance values are in ohms (Ω), unless otherwise indicated.

k	: 1,000 (Kilo)
M	: 1,000,000 (Mega)
Chip R	: Chip Resistor
Chip VR	: Chip Variable Resistor
Comp. R	: Composition Resistor
CR	: Carbon Film Resistor
FR	: Fusible Resistor
MFR	: Metal Film Resistor
MPR	: Metal Plate Resistor
OMR	: Oxide Metal Film Resistor
PMR	: Precision Metal Film Resistor
UFR	: Unflammable Resistor
VR	: Variable Resistor (Potentiometer)
WR	: Wire Wound Resistor

CAPACITORS—All capacitance values are in μF, unless otherwise indicated.

pF	: μμF (Pico farad)
C Cap	: Caramic Capacitor
Chip Cap	: Chip Capacitor
Chip T Cap	: Chip Tantalum Capacitor
E Cap	: Electrolytic Capacitor
FM Cap	: Film Mica Capacitor
LL Cap	: Low Leak Current Electrolytic Capacitor
MM Cap	: Metalized Mylar Capacitor
MP Cap	: Metalized Paper Capacitor
MY Cap	: Mylar Capacitor
NP Cap	: Non-polar Capacitor
PC Cap	: Polycarbonate Capacitor
PP Cap	: Polypropylene Capacitor
PS Cap	: Polystyrol Capacitor
T Cap	: Tantalum Capacitor
TF Cap	: Thin Film Capacitor
TR Cap	: Trimmer Capacitor

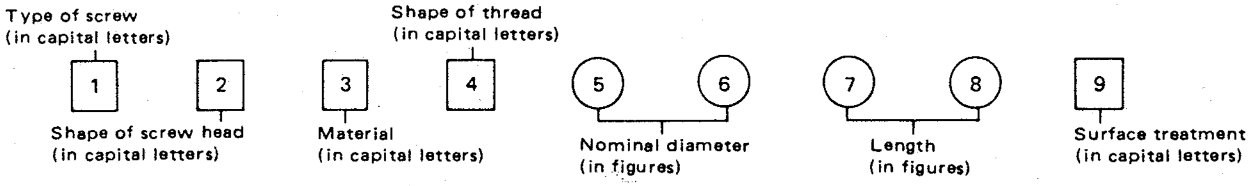
NOTES:

- [M] indicates mechanical symbol number.
- [2 digits] indicates circuit board symbol number.
- "X " indicates quantity per set.

5.1 STANDARD PART NUMBER CODING

5.1.1 Screw coding

Standard screw part numbers are as follows.

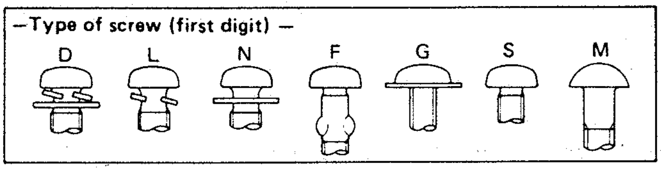

Type of screw
(in capital letters)
Shape of thread
(in capital letters)
1
2
3
4
5
6
7
8
9
Shape of screw head
(in capital letters)
Material
(in capital letters)
Nominal diameter
(in figures)
Length
(in figures)
Surface treatment
(in capital letters)

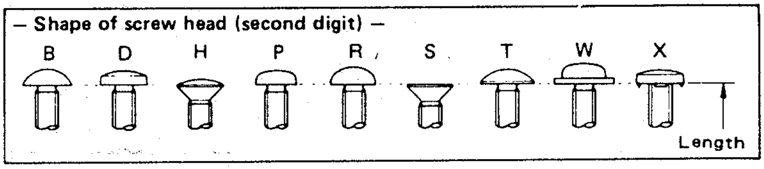
Type of screw (first digit)

S	Normal screws	
D	Assembled machine screws	(with plain and spring washers)
L	"	(with spring washer)
N	"	(with plain washer)
F	Feather screws	
G	Washer head tapping screws	
M	Wood screws	

Shape of screw head (second digit)

B	Brazier head
D	Binding head
H	Oval countersunk head
P	Pan head
R	Round head
S	Flat head
T	Truss head
W	Washer head (machine screws)
X	Toothed head


—Type of screw (first digit) —
D
L
N
F
G
S
M

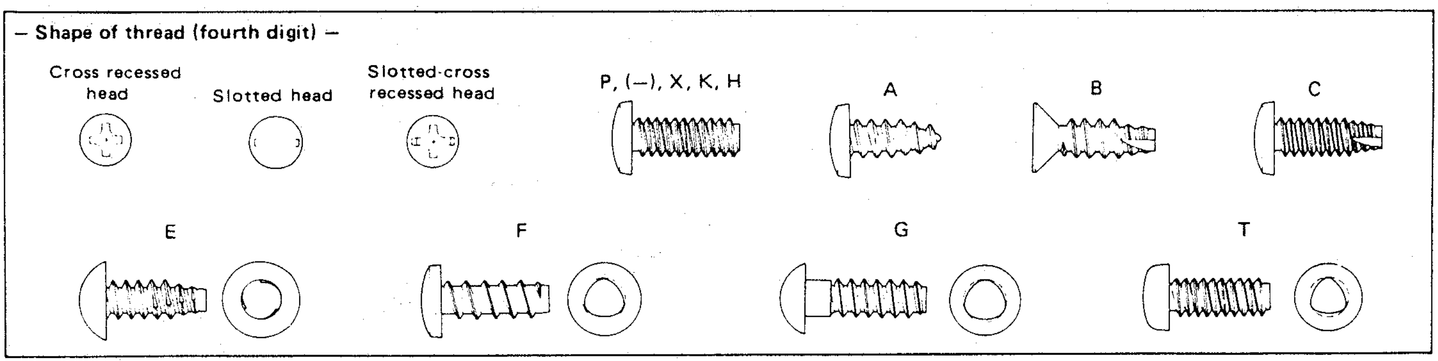

— Shape of screw head (second digit) —
B
D
H
P
R
S
T
W
X
Length

Material (third digit)

S	Steel	N	Nickel silver
E	Stainless steel	Y	Cast brass
C	Cast iron	A	Aluminum
U	Copper	Z	Zinc alloy
B	Brass	K	Polycarbonate
P	Phosphor bronze		

Shape of thread (fourth digit)

P	Cross recessed head screws	
(–)	Slotted head machine screws	
X	Slotted-cross recessed head machine screws	
K	Cross recessed head machine screws for precision equipment	(type 1)
H	"	(type 3)
A	Cross recessed head tapping screws	(type 1)
B	"	(type 2)
C	"	(type 3)
E	Cross recessed head special tapping screws	(brand : evertight)
F	"	(brand : P-tight)
T	"	(brand : taptight)
G	"	


– Shape of thread (fourth digit) –
Cross recessed head
Slotted head
Slotted-cross recessed head
P, (–), X, K, H
A
B
C
E
F
G
T

Nominal diameter (fifth and sixth digits)

The fifth and sixth digits indicate a nominal diameter or dimension. If the dimension exceeds 10 mm, three digits are used. The number indicates a nominal diameter or dimension, given in millimeters, multiplied by ten.

Length (seventh and eighth digits)

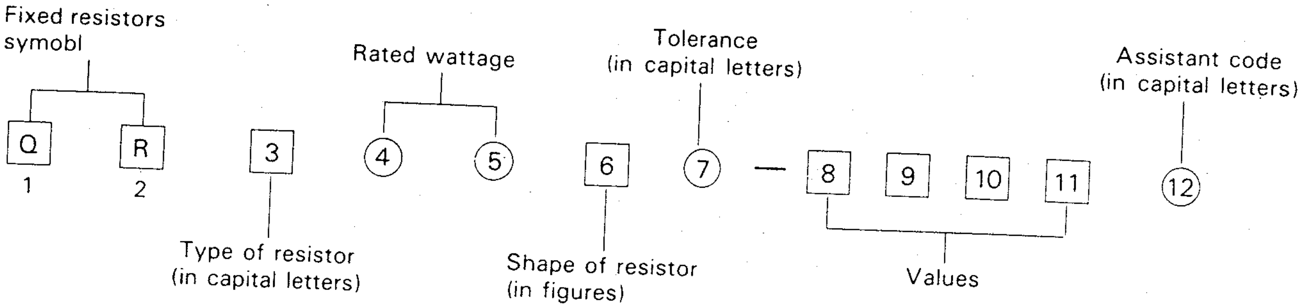
The seventh and eighth digits indicate length in millimeters. The preceding figure is zero when the dimension is smaller than 10 mm. For machine screws used in precision equipment whose length is given in units of 0.1 mm, the number indicates ten times the size of their length.

Surface treatment (ninth digit)

Z	Dichromate treatment after galvanizing (MFZn II-C)
N	Nickel plating (MFNi II, MFNi I)
R	Chromium plating (MBCr II, MBCr I)
G	Silver plating (SP4)
B	Black coating after plating
F	Blackening of iron (FB)
M	Blackening after galvanizing
K	Pickling of brass (PF2)
P	Phosphate treatment
W	Uni-chrome plating
L	Coated with transparent paint
A	Colored red after galvanizing (MFZn II-C)
C	Colored blue after galvanizing (MFZn II-C)
T	Colored green after galvanizing (MFZn II-C)
V	Colored purple after galvanizing (MFZn II-C)

5.1.2 Fixed resistor coding

Fixed resistor part numbers are as follows.


Fixed resistors symobl
Rated wattage
Tolerance (in capital letters)
Assistant code (in capital letters)
Q
R
1
2
3
4
5
6
7
—
8
9
10
11
12
Type of resistor (in capital letters)
Shape of resistor (in figures)
Values

Type of resistor (third digit)

C	Composition resistors
D	Carbon film resistors
F	Unflammable resistors
G	Oxide metal film resistors
H	Fusible resistors
M	Metal plate resistors
S	Metal glazed resistors
V	Precision metal film resistors
W	Wire wound resistors
X	Metal film resistors
Z	Special resistors

Rated wattage (fourth and fifth digits)

A0	1/10 W
18	1/8 W
16	1/6 W
14	1/4 W
12	1/2 W
01	1 W
02	2 W
03	3 W
04	4 W
05	5 W
06	6 W
07	7 W
75	7.5 W
08	8 W
10	10 W
15	15 W
A6	16 W
20	20 W
30	30 W

Tolerance (seventh digit)

F	± 1 %
G	± 2 %
J	± 5 %
K	± 10 %
M	± 20 %

Assistant code (twelfth digit)

A	Small type
B	Small type
S	Small type
Y	Lead taping
Z	Lead taping

Values (eighth – tenth or eleventh digits)

examples:

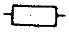
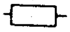
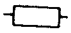
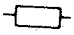
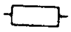
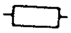
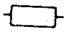
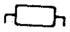
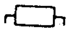
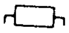
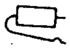
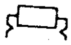
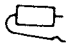
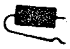
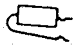
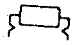
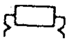
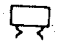
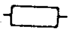
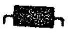
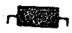
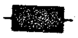
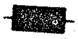
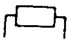
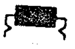
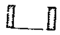
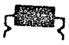
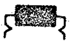
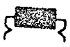
R47		0.47 Ω
4R7		4.7 Ω
470	47×10^0	47 Ω
471	47×10^1	470 Ω
472	47×10^2	4.7 kΩ
473	47×10^3	47 kΩ
474	47×10^4	470 kΩ
475	47×10^5	4.7 MΩ

QRV resistance shown by four digits:

4640	464×10^0	464 Ω
4641	464×10^1	4.64 kΩ
4642	464×10^2	46.4 kΩ

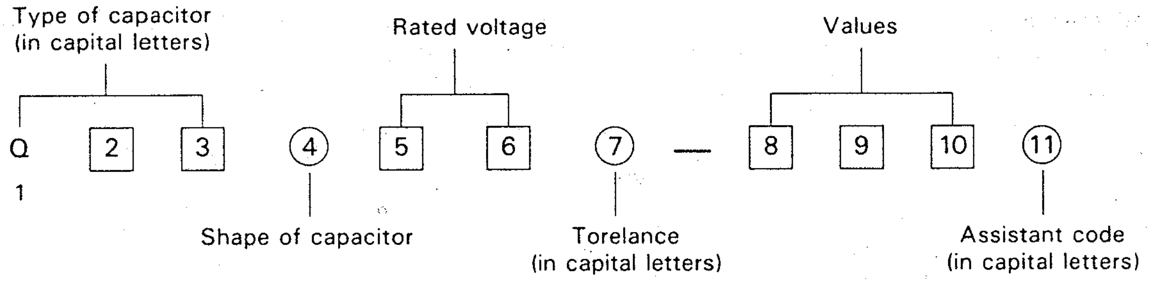
Shape of resistor (sixth digit)

Note: ■ indicates flame retardant resistor.

Type of resistor / Shape of resistor	C	D	F	G	H	M	S	V	W	X
1										
2										
3										
4										
5									(L) type	
6										
7			Lug (B) type							
8			Lug (A) type				 Chip			
9			Lug (C) type							

5.1.3 Fixed capacitor coding

Fixed capacitor part numbers are as follows.


Type of capacitor (in capital letters)
Rated voltage
Values
Q
1
2
3
4
5
6
7
—
8
9
10
11
Shape of capacitor
Torelance (in capital letters)
Assistant code (in capital letters)

Ceramic capacitors

Type of capacitor (first — third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Mono-direction	Kink lead	Axial lead	Axial forming lead	Chip
QCC	Ceramic	1		4	5	
QCD	High capacitance					A
QCF	High capacitance	1,4	3			8,A
QCS	Temperature compensation	1	3	4	5	8,A
QCT	Temperature compensation	Special coding				8,A
QCV	Ceramic			1	3	
QCX	Ceramic			1	3	
QCY	High capacitance	1,4	3	6	7	8,A
QCZ	Special type	Special coding				
QCB	Ceramic			B	C	

Electrolytic capacitors

Type of capacitor (first-third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Tubular	Mono-direction	Anti-stress	Forming	Snap-in
QEB	Low leakage		4	5	6	
QEC	Low leakage		4,8,A	9,B	6,C	
QEE	Tantalum (normal)		4	5	6	
	Tantalum (small)		8			
QEF	Chip tantalum	8 (chip type)				
QEG	Low impedance		4			
QEK	Miniature type		4	5	6	
QEL	Small type		4	5	6	7
QEM	Small type		4,A	5	6	
QEN	Non-polar	2	4	5	6	
QEP	Non-polar (small)		4,A	5,B	6,C	
QER	Miniature type		4	5	6	
QET	Small type	2	4,A	5,B	6,C	7
QEU	Small type		4	5	6	
QEV	Small type		4		6	7
QEW	Normal	2	4	5	6	7

Paper film capacitors

Type of capacitor (first — third digits)		Shape of capacitor (fourth digit)				
		Tubular	Normal		Flame retardant	
Symbol	Characteristics		Mono-direction	Kink lead	Mono-direction	Kink lead
QFA	Metalized polypropylene				7	
QFE	Metalized mylar				5	
QFF	Film mica		4			
QFG	Polypropylene film		4	8		
QFH	Metalized mylar	2	4	3	5,7	6
QFJ	Mylar (special)		4			
QFK	Metalized mylar (small)				5	
QFM	Mylar	2	4	3,7	5	6
QFN	Mylar (small)		4	3		
QFP	Polypropylene		4	3,8		
QFS	Polystyrole	2	4	3		
QFV	Thin film		4	8		
QFZ	Special type	Special coding				

Rated voltage (fifth and sixth digits)

Sixth digit / Fifth digit	A	B	C	D	E	F	G	H	J	K	V	W	X
0						3.15	4.0		6.3				
1	10		16	20	25		40	50	63	80	35		
2	100	125	160	200	250	315	400	500	630		350	450	600
3	1000	1250		2000				5000					

Tolerance (seventh digit)

A	$^{+100}_{-10}$ %	M	±20 %
F	±1 %	N	±30 %
G	±2 %	P	$^{+100}_{-0}$ %
H	$^{+50}_{-10}$ %	R	$^{+30}_{-10}$ %
J	±5 %	X	$^{+40}_{-20}$ %
K	±10 %	Z	$^{+80}_{-20}$ %

Values (eighth — tenth digits)

Example : Values are in picofarads

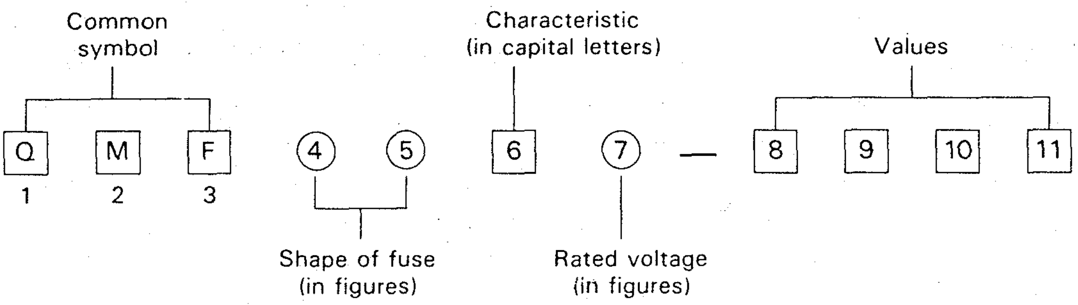
101	10×10^1 pF	100 pF
102	10×10^2 pF	1,000 pF (0.001 μF)
103	10×10^3 pF	10,000 pF (0.01 μF)
104	10×10^4 pF	100,000 pF (0.1 μF)
105	10×10^5 pF	1 μF
5R0		5.0 pF

Assistant code (eleventh digit)

G	Small size
Z	Lead taping
Y	Lead taping

5.1.4 Fuse coding

Standard fuse part numbers are as follows.


Common symbol
Characteristic (in capital letters)
Values
Q
M
F
1
2
3
4
5
6
7
8
9
10
11
Shape of fuse (in figures)
Rated voltage (in figures)

Shape of fuse
(fourth and fifth digits)

51	ϕ5.2 × 20 mm
60	ϕ6.4 × 30 mm
61	ϕ6.35 × 31.8 mm
63	ϕ6.4 × 30 mm with lead wires
66	ϕ6.35 × 31.8 mm with lead wires
00	Special type

Rated voltage
(seventh digit)

1	AC125 V
2	AC250 V
3	0.1 – 1 A : AC250 V 1.25 – 6.3 A : AC125 V

Values
(eighth-tenth or eleventh digits)
example:
R63 .... 0.63 A
1R0 .... 1.0 A
2R5 .... 2.5 A
100 .... 10 A
R315 .... 0.315 A
1R25 .... 1.25 A

Characteristics (sixth digit)

Symbol	Fusing Current	Fusing Time	Remarks
A	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
B	210 %	Within 30 min.	Regular fusible type (for SEMKO, Europe)
	275 %	0.05 – 2 sec.	
	400 %	0.01 – 0.3 sec.	
C	135 %	Within 1 hr.	Regular fusible type (for UL, Japan)
	200 %	Within 2 min.	
E	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
J	135 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
M	135 %	Within 1 hr.	Regular fusible type (for UL)
	200 %	Within 2 min.	
R	160 %	Within 1 hr.	Regular fusible type
	200 %	Within 2 min.	
S	160 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
	700 % – 2000 %	Within 0.01 sec.	
U	135 %	Within 1 hr.	Anti-rush type (for UL)
	200 %	Within 2 min.	
	800 % – 2000 %	Within 0.01 sec.	

* * *

PACKING ASSEMBLY [M1]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	1	PQ31473-9-1	PACKING CASE, E
		PQ31473-1-1	PACKING CASE, EG
		PQ31473-10-1	PACKING CASE, EK
	2	PQ31467B	CUSHION ASSEMBLY
	3	PQ41026-8	PROTECT SHEET
	4	PQM30021-59-11	POLY BAG, E/EG
		PUP30320-26-12	POLY BAG, EK
	5	PUP40329	SERIAL NO. STICKER, X 2
⚠	6	PU59167-3	CABLE ASSEMBLY
	7	–	–
	8	QPGA020-02003	POLY BAG, E/EG, FOR JAPAN MADE SET
#		QPGA020-02005	POLY BAG, E/EG, FOR W. GERMANY MADE SET
		PQM30023-8	POLY BAG, EK
⚠	9	PU30425-855	INSTRUCTION BOOK, E
⚠		PU30425-853	INSTRUCTION BOOK, EG
⚠		PU30425-857	INSTRUCTION BOOK, EK
	10	BT-20069A	WARRANTY CARD, EG
		BT-20060	GUARANTY CARD
	11	QPGA025-03505	POLY BAG, E/EG
		PQM30023-5	POLY BAG, EK
⚠	12	PU36158	DBP INF SHEET, EG ONLY
⚠	13	BT-20066	E. DISTRI LIST, EK ONLY
	14	–	–
⚠	15	PQ10342H	REMOCON UNIT, E, INCL. 16, REFER TO [M5]
⚠		PQ10342D	REMOCON UNIT, EG, INCL. 16, REFER TO [M5]
⚠		PQ10342N	REMOCON UNIT, EK, INCL. 16, REFER TO [M5]
	16	PQ10342-009	POLY BAG
	17	UM-4NJ2P	BATTERY, 2 CELLS
	18	–	CABINET ASSEMBLY, REFER TO [M2]
	19	PTE-30-101	CASSETTE TAPE, E
		PTE-30	CASSETTE TAPE, EG
	20	–	VPS UNIT, EG ONLY, VU-V90E, REFER TO SERVICE MANUAL NO. 8457(2/2)

* * *

CABINET ASSEMBLY [M2]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
⚠	1	PQ10332E-6	FRONT PANEL ASS'Y, E, INCL. 31–45
⚠		PQ10332B-6	FRONT PANEL ASS'Y, EG, INCL. 31–45
⚠		PQ10332F-6	FRONT PANEL ASS'Y, EK, INCL. 31–45
	2	PQ31335-4	FDP FILTER
	3	–	SW/DISP. BOARD ASS'Y, REFER TO [28]
	4	–	OPE. BOARD ASS'Y, REFER TO [22]
	5	–	–
	6	SDSF2608Z	TAP. SCREW, X8, T/DISP AND OPE. BOARDS
	7	PQ42636-1-1	EARTH BRACKET
⚠	8	PQ10328-2-3	TOP COVER
	9	SDSA4014M	TAP. SCREW, X 4, TOP COVER
⚠	10	PQ10330-1-2	BOTTOM COVER
	11	SDSF3010Z	TAP. SCREW, X 3, BOTTOM COVER
	12	PU57662-1-1	FOOT, X 4
	13	PQ31214-1-1	VOLUME KNOB, X 2
	14	PQ31267-33	C. HOUSING DOOR, E
		PQ31267-9-14	C. HOUSING DOOR, EG
		PQ31267-24-14	C. HOUSING DOOR, EK
	15	PQ42410-1-1	TORSION SPRING
	16	–	CHASSIS ASSEMBLY, REFER TO [M3]
	17	–	RATING LABEL
	18	–	RATING LABEL 2, E/EG
⚠	19	PQ41700	LABEL, EK ONLY, FOR JAPAN MADE SET
# ⚠		PQ41700-2	LABEL, EK ONLY, FOR U. K. MADE SET
⚠	20	PU58020-3	CAUTION LABEL, EK ONLY, FOR JAPAN MADE SET
# ⚠		PU58020-4	CAUTION LABEL, EK ONLY, FOR U. K. MADE SET
	21	–	–
	22	PQ42353	MEMORY BUTTON
	23	–	–
	24	–	–
	25	–	–
	26	–	–
	27	–	–
	28	–	–
	29	–	–
	30	–	–
	31	PQ20332-2	BUTTON COVER (L), E/EK
		PQ20332	BUTTON COVER (L), EG
	32	PQ20294	OPE. BUTTON
	33	PQ31204	POWER BUTTON, POWER, EJECT
	34	–	–
	35	PQ31384	PROGRAM BUTTON
	36	PQ31228E	DOOR ASSEMBLY, E
		PQ31228B	DOOR ASSEMBLY, EG
		PQ31228F	DOOR ASSEMBLY, EK
	37	PQ31466-1-2	EARTH BRACKET
	38	PQ31212-4	BUTTON COVER (R), E/EK
		PQ31212-2	BUTTON COVER (R), EG
	39	PQ31213	TEN KEY BUTTON
	40	PQ31206	COUNTER BUTTON
	41	PQ31213-2	TEN KEY BUTTON
	42	PQ42474-2	PLATE, E/EK
		PQ42474-3	PLATE, EG
	43	PQ42351	CHANNEL BUTTON, X 2
	44	PQ42350	INSTANT REC BUTTON
	45	PQ20287-4	DISPLAY WINDOW, E/EK
		PQ20287-2	DISPLAY WINDOW, EG
	46	PQ41808	IFR FILTER
	47	PQ42473	MARK
	48	PQ31417	PUSH BUTTON

* * *

CHASSIS ASSEMBLY [M3]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	1	–	MECHANISM ASS'Y, REFER TO [M4]
	2	–	MOTHER BOARD ASS'Y, REFER TO [05]
	3	–	P. TRANS BOARD ASS'Y, REFER TO [01]
	4	–	REGULATOR BOARD ASS'Y, REFER TO [02]
	5	–	TERMINAL BOARD ASS'Y, REFER TO [06]
	6	–	PRE/REC AMP BOARD ASS'Y, REFER TO [43]
	7	–	VIDEO BOARD ASS'Y, REFER TO [03]
	8	–	MECHACON BOARD ASS'Y, REFER TO [04]
	9	–	TUNER/IF BOARD ASS'Y, REFER TO [07]
	10	–	DRUM MDA BOARD ASS'Y, REFER TO [57]
	11	–	RF CONV. & MIX BOOSTER, REFER TO [07]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	12	PUS28277C	CASS. HOUSING ASS'Y, INCL. 41–49
	13	–	CHASSIS
	14	–	–
	15	–	UPPER DRUM BOARD, REFER TO [41]
	16	PDM2004B	UPPER DRUM ASS'Y
	17	PDM4001A	DRUM SCREW ASS'Y (SDBP3008N + SPACER), X 2
	18	PDM2024F	LOWER DRUM MOTOR ASS'Y
	19	–	–
	20	–	–
	21	PDM4015A-4	BRUSH ASS'Y
	22	DPSP2606Z	ASS'Y SCREW
	23	PU49483-3	COMMUTATOR
	OR	PQ41596A	COMMUTATOR ASS'Y
	24	LPSP2608Z	ASS'Y SCREW, X 3
	25	PQ31242	EARTH SPRING
	26	SDSA4014Z	TAP. SCREW, X 2
	27	PQ41396	SPECIAL SCREW (SDSA4012Z + WASHER)
	28	PQ31176	SUPPORT BRACKET
	29	SDSF3010Z	TAP. SCREW, X 7, MOTHER BOARD
	30	SDSF3010Z	TAP. SCREW, X 3, TUNER/IF BOARD
	31	SDSF3012Z	TAP. SCREW, X 2, HEAT SINK
	32	GPST2606Z	TAP. SCREW, X 2, VIDEO BOARD
⚠	33	PQ31241-1-1	AC COVER
	34	SDST2605Z	TAP. SCREW, X 2, PRE/REC AMP BOARD
	35	SDST2605Z	TAP. SCREW, X 2, CASS. HOUSING
	36	SDST3006C	TAP. SCREW, TRANS BRACKET
⚠	37	SDSA4014Z	TAP. SCREW, X 2, TRANS
⚠	38	PU59212	POWER TRANSFORMER, E/EG
⚠		PU59383	POWER TRANSFORMER, EK
	39	–	FUSE, X 3, F1–F3, REFER TO [01]
	40	–	–
⚠	41	PQ42385A	MOTOR ASS'Y
⚠	OR	PQ42385B	MOTOR ASS'Y
	42	SPSP2603Z	SCREW, X 2
	43	PQM30001-209	TENSION SPRING, X 2
	44	PQM30003-18	BELT
	45	–	CASS. HOUSING BOARD, REFER TO [56]
	46	SPSP2604Z	SCREW
	47	SPST2605Z	TH TAP. SCREW
	48	QFN41HK-104	MY CAP
	OR	QFN41HJ-104	MY CAP
	OR	QFV41HJ-104	MY CAP
	49	QXT3100-010	VINYL TUBE, X2
	50	SDSP2606Z	SCREW, DRUM MDA BOARD
⚠	51	SDST3006Z	TAP. SCREW, X 2, P. TRANS. BOARD
	52	PQ42631-1-2	SUPPORT BRACKET
	53	PQ31171-2	DRUM SHIELD
	54	SDST2605Z	TAP. SCREW, X 2, DRUM SHIELD
	55	–	SERVO BOARD ASS'Y, REFER TO [08]
	56	–	AUDIO BOARD ASS'Y, REFER TO [09]
⚠	57	QMP3980-200	POWER CORD, E/EG
⚠		QMP5140-200	POWER CORD, EK
	58	–	–
⚠	59	QHS3771-108	STRAIN RELIEF
⚠	60	PQ31201	TRANS BRACKET
	61	PU49485-4	WIRE CLAMP, X 2
	62	SDSF3010Z	TAP. SCREW, WIRE CLAMP
	63	–	–
	64	–	–
	65	–	TIMER BOARD ASS'Y, REFER TO [15]
	66	SDST2605Z	TAP. SCREW, SUPPORT BRACKET
	67	PU59082	PRE SHIELD (3)

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MECHANISM ASSEMBLY [M4]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	1	–	MAIN DECK ASS'Y
	2	–	–
	3	–	–
	4	–	–
	5	–	–
	6	–	–
	7	PQ41944A-7	TENSION ARM ASS'Y INCL. 8
	8	PQ41952-3	SPRING
	9	PQ41948A	TENSION BAND ASS'Y
	10	SDST2606N	TAP. SCREW, TENSION BAND ASS'Y
	11	PU57641	FULL ERASE HEAD
	12	PQ31036	FE HEAD BASE
	13	SPSG2606Z	TAP. SCREW, FE HEAD
	14	PQ41954-1-1	TORSION SPRING
	15	PQ41955	IMPEDANCE ROLLER
	16	PQ41956	COLLAR
	17	PQ41957	LOWER FLANGE
	18	PQM30018-39	SPACER
	19	PQM30002-124	COMP. SPRING
	20	PQ40353	NYLON NUT
	21	PU59253	A/CTL HEAD
	22	PU55535	SHIELD CAP
	23	HPSP2015N	SCREW, SHIELD CAP
	24	PQ42208	HEAD BASE
	25	SPSP2608Z	SCREW, X 3, A/CTL HEAD
	26	PU30080-49	SPRING, X 3
	27	–	A/CTL HEAD BOARD,REFER TO [12]
	28	SDSP2606Z	SCREW, X2, HEAD BASE
	29	PQ41963A-1	P. BASE ASS'Y (T)
	30	PQ41969A	P. BASE ASS'Y (S)
	31	PQM30017-5	SLIT WASHER, X 2
	32	PU53629-2	TAPE GUIDE
	33	–	–
	34	PQ40268-2	GUIDE FLANGE, X 2
	35	PQ41346	GUIDE POLE CAP
	36	SDSP2006Z	SCREW, TAPE GUIDE
⚠	37	PU58635V	CAPSTAN MOTOR
	38	SPSP2605N	SCREW, X3, CAPSTAN MOTOR
	39	PQ41974A	R M BRACKET ASS'Y
⚠	40	PU58636W	REEL MOTOR
	41	LPSP2604Z	SCREW, X2, REEL MOTOR
	42	PU58645-1-1	IDLER ARM
	43	Q03093-834	WASHER
	44	PQ41976A	SPRING ARM ASS'Y, INCL. 45
	45	PQ42212	TENSION SPRING
	46	PQM30017-22	SLIT WASHER
	47	PQ41978	HOLDER
	48	SPST2606Z	TAP. SCREW

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	49	SPST2606Z	TAP. SCREW, X 2
	50	PU59250	REEL DISK (S)
	51	PU58638-1-2	REEL DISK (T)
	52	PQM30017-5	SLIT WASHER, X 2
	53	Q03093-828	WASHER, X 2
	54	PQ41979A-4	L ARM ASS'Y (S)
	55	PQ41985A-2	L ARM ASS'Y (T)
	56	PQ41992A-1	CAM BRACKET ASS'Y
	57	PQ41994A-1	ARM GEAR ASS'Y
	58	–	–
	59	PQ20250-1-1	CONTROL CAM
⚠	60	PQ41996A	MODE MOTOR ASS'Y
	61	PQ41998A	WORM ASS'Y
	62	LPSP2604Z	SCREW, X2, MODE MOTOR
	63	PQ42001	WINDMILL
	64	PQ42002	CLUTCH SPRING
	65	PQ42003	WORM SHAFT
	66	PQM30017-5	SLIP WASHER, X 2
	67	PQM30003-17	BELT
	68	PQM30018-22	SPACER
	69	–	RELAY BOARD, REFER TO [52]
	70	SPST2606Z	TAP. SCREW, X 2, RELAY BOARD
	71	SPST2606Z	TAP. SCREW, X 2, CAM BRACKET ASS'Y
	72	SPSP2603Z	SCREW, CAM BRACKET ASS'Y
	73	PQ42038A-3	PLATE ASS'Y INCL. 74–76
	74	PQ31044-1-2	LOCK LEVER
	75	PQM30001-191	TENSION SPRING
	76	PQM30001-211	TENSION SPRING
	77	PQM30017-28	SLIT WASHER, X 2
	78	PQ42006B	P R ARM ASS'Y
	79	PQM30017-28	SLIT WASHER
	80	Q03093-833	WASHER
	81	PQM30001-193	TENSION SPRING
	82	PQ42013B-4	GUIDE ARM ASS'Y INCL. 83
	83	PQ42029	SPRING
	84	PQM30017-6	SLIT WASHER
	85	PQ42019A-3	M. BRAKE ASS'Y (S)
	86	PQ42020A-2	M. BRAKE ASS'Y (T)
	87	PQM30001-216	CLUTCH SPRING
	88	PQ42021A-1	SUB BRAKE ASS'Y (S) INCL. 89
	89	PQ42023-1-2	TENSION SPRING
	90	PQ42037A-2	SUB BRAKE ASS'Y (T)
	91	PU59452	LED HOLDER
	OR	PU58640	LED HOLDER
	92	SPST2606Z	TAP. SCREW, LED HOLDER
	93	–	END SENSOR BOARD ASS'Y, REFER TO [54]
	94	SPST2606Z	TAP. SCREW, END SENSOR BOARD
	95	PU58642	SLIDE ENCODER
	96	SDSP2610Z	SCREW, SLIDE ENCODER
	97	–	DECK TERMINAL BOARD ASS'Y, REFER TO [51]
	98	–	REC SAFETY BOARD ASS'Y, REFER TO [53]
	99	SDSP2606Z	SCREW, X 3, DECK TERMINAL BOARD
	100	SDST2606Z	TAP. SCREW, REC SAFETY BOARD
	101	PW30110-26DD885	PARALLEL WIRE
	102	PU59251	REEL SENSOR (S)
	103	SPSP2603Z	SCREW, REEL SENSOR (S)
	104	PQM30017-6	SLIT WASHER

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REMOTE CONTROL UNIT [M5]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	1	–	REMOTE CONTROL UNIT, REFER TO [M1], INCL. 2–18
	2	PU36137-9	TOP CASE, E
		PU36137-4	TOP CASE, EG
		PU36137-10	TOP CASE, EK
	3	PQ31360	BOTTOM CASE
	4	PQ31361	BATTERY CAP
	5	PU36138-2	WINDOW
	6	PU36139-12	REMOCON LABEL, E
		PU36139-4	REMOCON LABEL, EG
		PU36139-13	REMOCON LABEL, EK
	7	–	REMOTE CONTROL BOARD ASS'Y, REFER TO [RM]
	8	PQ10342-002	RUBBER SHEET
	9	–	–
	10	–	–
	11	PQ10342-005	BATTERY TERMINAL
	12	PQ10342-015	BUTTON
	13	PQ10342-016	BUTTON, X 18
	14	PQ10342-017	BUTTON, X 3
	15	PQ10342-018	BUTTON, X 2
	16	PQ10342-019	BUTTON
	17	PQ10342-020	BUTTON
	18	PQ10342-021	BUTTON

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# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
⚠		PU22336D-01 (E/EK)	POWER SUPPLY BOARD ASS'Y[01],[02]
⚠		PU22336C-01 (EG)	POWER SUPPLY BOARD ASS'Y[01],[02]
	WR1	PU59295-101	WIRE ASSEMBLY
⚠	TAB	A74316	TAB, x 2

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# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22336D1(E/EK)	POWER TRANS. BOARD ASS'Y [01]
		PU22336C1(EG)	POWER TRANS. BOARD ASS'Y [01]
⚠	C101	OFZ9022-472	C CAP
⚠	HD1	PU57505	FUSE HOLDER, F1–F3
	D1	10E2	DIODE
	D2	10E2	DIODE
	D3	–	–
	D4	ERA15-02	DIODE
	OR	S5688G-TPA3	DIODE
	OR	1SR35-200AT-82	DIODE
	OR	11E2	DIODE
	D5	ERA15-02	DIODE
	OR	S5688G-TPA3	DIODE
	OR	1SR35-200AT-82	DIODE
	OR	11E2	DIODE
	DS1	S4VB10	DIODE STACK
⚠	LF1	PU59581	LINE FILTER, EG ONLY
⚠	LF2	PU59586	LINE FILTER, EG ONLY
	R1	–	–
⚠	R2	QRZ0052-100	FR
	C1	QFK52AK-473	M CAP
	C2	QETB1EM-228	E CAP
	C3	QETB1EM-478	E CAP
	C4	QETB1CM-478	E CAP
	C5	QETB1JM-476	E CAP
	C6	–	–
	C7	QETC1JM-107	E CAP
	OR	QETB1JM-107	E CAP

THE FOLLOWING FUSE ARE NOT INCLUDED IN
PU22336D1/PU22336C1

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
⚠	F1	QMF51E2-R315	FUSE
⚠	F2	QMF51E2-2R0	FUSE
⚠	F3	QMF51E2-1R0	FUSE

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# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22336D2(E/EK)	REGULATOR BOARD ASS'Y [02]
		PU22336C2(EG)	REGULATOR BOARD ASS'Y [02]
	SCR1	SDST3014Z	TAP. SCREW, IC1, X 2
	SCR2	SDST3006Z	TAP. SCREW, HEAT SINK, X 2
	IC1	STK5481	INTERGRATED CIRCUIT
	Q1	2SA720Q,R,S	TRANSISTOR
	Q2	2SA720Q,R,S	TRANSISTOR
	D6	HZ30-2	ZENER DIODE
	D11	MA165	DIODE
	OR	1SS133	DIODE
	D12	1SS133	DIODE
	OR	MA165	DIODE
	D13	MA161	DIODE
	R1	–	–
	R2	–	–
	R3	QRD181J-822	CR
⚠	R4	QRZ0052-221	FR
	R5	QRD181J-222	CR
	R6	QRD181J-272	CR
	R7	QRD181J-682	CR
	R8	QRD181J-223	CR
	R9	–	–
	R10	QRD181J-102	CR
	OR	QRD182J-102	CR
	R11	QRD181J-104	CR
	OR	QRD182J-104	CR
	C1	–	–
	C2	–	–
	C3	–	–
	C4	–	–
	C5	–	–
	C6	QETC1HM-106	E CAP
	OR	QET61HM-106	E CAP
	C7	–	–
	C8	–	–
	C9	QETC1HM-106	E CAP
	OR	QET61HM-106	E CAP
	C10	QETC1CM-476	E CAP
	C11	QETC1EM-106	E CAP
	OR	QET61EM-106	E CAP
	C12	QETC1CM-107	E CAP
	C13	QETC1CM-476	E CAP
	C14	QETC1CM-107	E CAP
	CN1	PU58931-14	CAP. HOUSING
	TAB	A74017	TAB
	TP	PU55774	TEST PIN, TP1, 2, GND
⚠	CP1	ICP-F10	CIRCUIT PROTECTOR
⚠	CP2	ICP-F15	CIRCUIT PROTECTOR
⚠	CP3	ICP-F15	CIRCUIT PROTECTOR
⚠	CP4	ICP-F20	CIRCUIT PROTECTOR
⚠	HTS1	PQ31187	HEAT SINK

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION

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PU11430D1-01(E/EG) VIDEO BOARD ASS'Y [03]
PU11430E1-01 (EK) VIDEO BOARD ASS'Y [03]

– LUMINANCE SECTION –

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	IC101	PU22282A	Y. MODULE (JA016)
	IC102	7VT12	INTEGRATED CIRCUIT
	IC201	TA7374P	INTEGRATED CIRCUIT
	IC202	MSM6989RS	INTEGRATED CIRCUIT
	IC203	BA7021	INTEGRATED CIRCUIT
	Q101	2SC1740S(QRS)	TRANSISTOR
	Q102	2SC1740S(QRS)	TRANSISTOR
	Q103		–
	Q104	2SC1740S(QRS)	TRANSISTOR
	Q105	2SC1740S(QRS)	TRANSISTOR
	Q106	2SC1740S(QRS)	TRANSISTOR
	Q107	–	–
	Q108	–	–
	Q109	–	–
	Q110	–	–
	Q111	2SC1740S(QRS)	TRANSISTOR
	Q112	2SA1309R,S	TRANSISTOR
	OR	2SA933S(RS)	TRANSISTOR
	Q113	2SA1309R,S	TRANSISTOR
	OR	2SA933S(RS)	TRANSISTOR
	Q201	DTC124ES	D. TRANSISTOR
	Q202	DTC124ES	D. TRANSISTOR
	Q203	DTC124ES	D. TRANSISTOR
	Q204	DTC124ES	D. TRANSISTOR
	Q205	–	–
	Q206	–	–
	Q207	–	–
	Q208	2SC1740S(QRS)	TRANSISTOR
	Q209	2SC1740S(QRS)	TRANSISTOR
	Q210	2SC1740S(QRS)	TRANSISTOR
	Q211	2SA1309R,S	TRANSISTOR
	Q212	2SC1740S(QRS)	TRANSISTOR
	Q213	2SC1740S(QRS)	TRANSISTOR
	Q214	DTC124ES	D. TRANSISTOR
	Q215	2SC1740S(QRS)	TRANSISTOR
	Q216	DTC124ES	D. TRANSISTOR
	D101	MA165	DIODE
	OR	1SS133	DIODE
	D102	MA165	DIODE
	OR	1SS133	DIODE
	D103	OA90	DIODE
	D104	OA90	DIODE
	D105	MA165	DIODE
	OR	1SS133	DIODE
	D106	MA165	DIODE
	OR	1SS133	DIODE
	D201	–	–
	D202	MA165	DIODE
	OR	1SS133	DIODE
	D203	HZS9.1EB1	ZENER DIODE
	D204	–	–
	D205	–	–
	D206	MA165	DIODE
	OR	1SS133	DIODE
	D207	MA165	DIODE
	OR	1SS133	DIODE
	D208	MA165	DIODE
	OR	1SS133	DIODE
	D209	MA165	DIODE
	OR	1SS133	DIODE
	D210	MA165	DIODE
	OR	1SS133	DIODE
	R101	QRD161J-332	CR
	R102	QRD161J-152	CR
	R103	QRD161J-102	CR
	R104	QRD161J-122	CR
	R105	QRD161J-821	CR
	R106	QRD161J-681	CR
	R107	QRD161J-102	CR
	R108	QRD161J-152	CR
	R109	QRD161J-101	CR
	R110	QVZ3518-222	VR, SP RF EQ
	R111	–	–
	R112	QRD161J-561	CR
	R113	QRD161J-222	CR
	R114	QRD161J-222	CR
	R115	QRD161J-391	CR
	R116	QRD161J-333	CR
	R117	QRD161J-333	CR
	R118	QRD161J-331	CR
	R119	QVZ3518-681	VR, REC FM LEV.
	R120	QRD161J-102	CR
	R121	QRD161J-392	CR
	R122	QRD161J-103	CR
	R123	QRD161J-562	CR
	R124	QRD161J-225	CR
	R125	QRD161J-475	CR
	R126	QRD161J-335	CR
	R127	QRD161J-102	CR
	R128	QRD161J-152	CR
	R129	QRD161J-153	CR
	R130	QRD161J-684	CR
	R131	QRD161J-824	CR
	R132	QRD161J-562	CR
	R133	QRD161J-152	CR
	R134	–	–
	R135	–	–
	R136	QRD161J-102	CR
	R137	ERT-D2FGL101S	THERMISTOR
	R138	–	–
	R139	–	–
	R140	–	–
	R141	QRD161J-102	CR
	R142	QRD161J-272	CR
	R143	QRD161J-181	CR
	R144	QRD161J-821	CR
	R145	QRD161J-181	CR
	R146	QRD121J-391	CR
	R201	–	–
	R202	QVZ3518-102	VR, LP RF EQ

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R203	QRD161J-471	CR
	R204	QRD161J-471	CR
	R205	–	–
	R206	–	–
	R207	–	–
	R208	–	–
	R209	–	–
	R210	–	–
	R211	QRD161J-562	CR
	R212	QRD161J-681	CR
	R213	–	–
	R214	QRD161J-391	CR
	R215	QRD161J-122	CR
	R216	QRD161J-681	CR
	R217	QRD121J-560	CR
	R218	QRD161J-103	CR
	R219	QRD161J-222	CR
	R220	QRD161J-393	CR
	R221	QRD161J-473	CR
	R222	QRD161J-332	CR
	R223	QVZ3518-682	VR, 0.5 H D. VIDEO LEVEL
	R224	QRD161J-102	CR
	R225	QRD161J-122	CR
	R226	QRD161J-153	CR
	R227	QRD161J-223	CR
	R228	QRD161J-561	CR
	R229	QRD161J-681	CR
	R230	QRD161J-681	CR
	R231	QRD161J-681	CR
	R232	QRD161J-471	CR
	R233	QRD161J-222	CR
	R234	QRD161J-102	CR
	R235	QRD161J-222	CR
	R236	QRD161J-183	CR
	R237	–	–
	R238	QRD161J-822	CR
	R239	QRD161J-122	CR
	R240	QRD161J-563	CR
	R241	QRD161J-822	CR
	R242	QRD161J-223	CR
	R243	QRD161J-103	CR
	R244	QRD161J-103	CR
	R245	QRD161J-103	CR
	R246	QRD161J-333	CR
	C101	QCVB1CN-103	C CAP
	C102	QCSB1HJ-560	C CAP
	C103	QCSB1HJ-470	C CAP
	C104	QET60JM-476	E CAP
	C105	QCVB1CN-103	C CAP
	C106	QCSB1HJ-470	C CAP
	C107	QCVB1CN-103	C CAP
	C108	QCVB1CN-103	C CAP
	C109	–	–
	C110	QCVB1CN-103	C CAP
	C111	QCVB1CN-103	C CAP
	C112	QCVB1CN-103	C CAP
	C113	QCVB1CN-103	C CAP
	C114	QCBB1HJ-121	C CAP
	C115	QCBB1HJ-121	C CAP

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	C116	QCSB1HJ-270	C CAP
	C117	QET60JM-476	E CAP
	C118	QCVB1CN-103	C CAP
	C119	–	–
	C120	–	–
	C121	QCBB1HJ-151	C CAP
	C122	QCSB1HJ-330	C CAP
	C123	QET61HM-105	E CAP
	C124	QET51HM-105	E CAP
	C125	QCBB1HJ-151	C CAP
	C126	QCBB1HJ-151	C CAP
	C127	QET61HM-225	E CAP
	C128	QER60JM-107	E CAP
	C129	QER60JM-107	E CAP
	C130	QET61EM-335	E CAP
	C131	QER41HM-105	E CAP
	C132	QER41HM-225	E CAP
	C133	QER41HM-335	E CAP
	C134	QER41HM-225	E CAP
	C135	QER41EM-475	E CAP
	C136	QEN41EM-335	NP E CAP
	C137	QEM51AK-107	E CAP
	C138	QCVB1CN-103	C CAP
	C139	QCBB1HJ-181	C CAP
	C140	QCBB1HJ-121	C CAP
	C141	QCSB1HJ-560	C CAP
	C142	QCSB1HJ-220	C CAP
	C143	–	–
	C144	QCBB1HJ-121	C CAP
	C145	QCBB1HJ-151	C CAP
	C146	QET61EM-475	E CAP
	C147	QET61CM-476	E CAP
	C148	QCVB1CN-103	C CAP
	C201	QCSB1HJ-120	C CAP
	C202	QFN31HJ-223	MY CAP
	C203	–	–
	C204	–	–
	C205	–	–
	C206	–	–
	C207	–	–
	C208	–	–
	C209	–	–
	C210	–	–
	C211	QCVB1CN-103	C CAP
	C212	QCSB1HJ-100	C CAP
	C213	QCVB1CN-103	C CAP
	C214	QET60JM-476	E CAP
	C215	–	–
	C216	QCSB1HJ-390	C CAP
	C217	QFN31HJ-102	MY CAP
	C218	QET61EM-475	E CAP
	C219	QCBB1HJ-102	C CAP
	C220	QFN31HJ-473	MY CAP
	C221	QET61AM-107	E CAP
	C222	QCVB1CN-103	C CAP
	C223	–	–
	C224	QEK61HM-104	E CAP
	C225	QET61EM-475	E CAP
	C226	QCVB1CN-103	C CAP

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	C227	QCVB1CN-103	C CAP
	C228	–	–
	C229	QET60JM-476	E CAP
	C230	QCVB1CN-103	C CAP
	C231	–	–
	C232	–	–
	C233	QER41CM-106	E CAP
	C234	QER41CM-476	E CAP
	C235	QCVB1CN-103	C CAP
	C236	QCSB1HJ-330	C CAP
	C237	QCVB1CN-270	C CAP
	C238	QER41AM-476	E CAP
	C239	QCSB1HJ-200	C CAP
	C240	–	–
	C241	QCVB1CN-103	C CAP
	C242	QCVB1CN-103	C CAP
	C243	QCBB1HJ-121	C CAP
	C244	QER60JM-107	E CAP
	C245	QCVB1CN-103	C CAP
	C246	QEK61HM-104	E CAP
	C247	QEK61HM-105	E CAP
	C248	QET61AM-476	E CAP
	L101	PU48530-101K	PEAKING COIL
	L102	PU59152-560J	PEAKING COIL
	L103	PU59152-270J	PEAKING COIL
	L104	PU59152-180J	PEAKING COIL
	L105	–	–
	L106	PU59152-221J	PEAKING COIL
	L107	PU59152-680J	PEAKING COIL
	L108	PU59152-270J	PEAKING COIL
	L109	PU48530-101K	PEAKING COIL
	L110	–	–
	L111	PU59152-121J	PEAKING COIL
	L112	PU59152-180J	PEAKING COIL
	L113	PU59152-180J	PEAKING COIL
	L114	PU48530-471J	PEAKING COIL
	L115	PU59152-121J	PEAKING COIL
	L116	PU48530-101K	PEAKING COIL
	L117	PU59152-560J	PEAKING COIL
	L118	PU59152-680J	PEAKING COIL
	L119	PU48530-681J	PEAKING COIL
	L120	–	–
	L121	PU48530-101K	PEAKING COIL
	L201	PU48530-101K	PEAKING COIL
	L202	PU48530-101K	PEAKING COIL
	L203	PU48530-101K	PEAKING COIL
	L204	PU59152-560J	PEAKING COIL
	L205	PU59152-390J	PEAKING COIL
	L206	PU48530-101K	PEAKING COIL
	L207	PU48530-101K	PEAKING COIL
	EQ201	PU58315	EQUALIZER
	LPF101	PU58021-2	LOW PASS FILTER
	DL101	PU59173	1H DELAY LINE
	CN101	PU58844-12	CAP. HOUSING

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	TP	PU57545	TEST PIN, TP106, 110, 121, 221, 222, GND 1, GND 2

– COLOUR SECTION –

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
⚠	IC301	PU22046A	COLOUR MODULE, JA005
	IC351	BA7007	INTEGRATED CIRCUIT
	IC401	AN3592K	INTEGRATED CIRCUIT
	Q301	2SC1740S(QRS)	TRANSISTOR
	Q302	2SC1740S(QRS)	TRANSISTOR
	Q303	–	–
	Q304	–	–
	Q305	–	–
	Q306	–	–
	Q307	–	–
	Q308	–	–
	Q309	–	–
	Q310	–	–
	Q311	DTC144ES	D. TRANSISTOR
	Q312	DTC124ES	D. TRANSISTOR
	Q313	DTC144ES	D. TRANSISTOR
	Q314	DTC144ES	D. TRANSISTOR
	Q315	DTC144WS	D. TRANSISTOR
	Q316	DTC144ES	D. TRANSISTOR
	Q317	2SC1740S(QRS)	TRANSISTOR
	Q318	2SC1740S(QRS)	TRANSISTOR
	Q319	2SC1740S(QRS)	TRANSISTOR
	Q320	DTC144ES	D. TRANSISTOR
	Q351	2SC1740S(QRS)	TRANSISTOR, E/EG
	Q352	2SC1740S(QRS)	TRANSISTOR, E/EG
	Q401	2SC1740S(QRS)	TRANSISTOR
	Q402	2SC1740S(QRS)	TRANSISTOR
	Q403	2SC1740S(QRS)	TRANSISTOR
	Q404	2SC1740S(QRS)	TRANSISTOR
	Q405	2SC1740S(QRS)	TRANSISTOR
	Q406	2SC1740S(QRS)	TRANSISTOR
	Q407	2SC1740S(QRS)	TRANSISTOR
	Q408	–	–
	Q409	–	–
	Q410	–	–
	Q411	2SC2021Q,R,S	TRANSISTOR
	Q412	DTC124ES	D. TRANSISTOR, E/EG
	Q413	DTC124ES	D. TRANSISTOR
	Q414	2SC1740S(QRS)	TRANSISTOR
	Q415	DTC124ES	D. TRANSISTOR
	Q416	DTC124ES	D. TRANSISTOR
	Q417	DTC124ES	D. TRANSISTOR
	Q501	2SA933(S)	TRANSISTOR
	OR	2SA933S(S)	TRANSISTOR
	Q502	2SB643R,S	TRANSISTOR
	Q503	DTC144WS	D. TRANSISTOR
	Q504	2SB643R,S	TRANSISTOR
	Q505	2SB643R,S	TRANSISTOR
	Q506	DTC124ES	D. TRANSISTOR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	Q507	DTC124ES	D. TRANSISTOR
	D301	MA165	DIODE
	OR	1SS133	DIODE
	D302	MA165	DIODE
	OR	1SS133	DIODE
	D303	MA165	DIODE
	OR	1SS133	DIODE
	D304	–	–
	D305	MA165	DIODE
	OR	1SS133	DIODE
	D306	MA165	DIODE
	OR	1SS133	DIODE
	D307	MA165	DIODE
	OR	1SS133	DIODE
	D308	MA165	DIODE
	OR	1SS133	DIODE
	D351	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D352	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D353	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D354	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D355	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D356	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D357	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D358	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D401	–	–
	D402	MA165	DIODE
	OR	1SS133	DIODE
	D403	MA165	DIODE
	OR	1SS133	DIODE
	D404	–	–
	D405	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D406	MA165	DIODE
	OR	1SS133	DIODE
	D501	MA165	DIODE
	OR	1SS133	DIODE
	D502	MA165	DIODE
	OR	1SS133	DIODE
	D503	MA165	DIODE
	OR	1SS133	DIODE
	D504	MA165	DIODE
	OR	1SS133	DIODE
	D505	MA165	DIODE
	OR	1SS133	DIODE
	D506	–	–
	D507	MA165	DIODE
	OR	1SS133	DIODE
	R301	QRD161J-102	CR
	R302	QRD161J-102	CR
	R303	QRD161J-473	CR
	R304	QRD161J-272	CR
	R305	QRD161J-681	CR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R306	QRD161J-102	CR
	R307	QRD161J-102	CR
	R308	–	–
	R309	–	–
	R310	–	–
	R311	QRD161J-562	CR
	R312	QRD161J-561	CR
	R313	QRD161J-561	CR
	R314	–	–
	R315	–	–
	R316	QRD161J-221	CR
	R317	QRD161J-391	CR
	R318	QRD161J-122	CR
	R319	QRD161J-393	CR
	R320	QRD161J-103	CR
	R321	QRD161J-103	CR
	R322	QVZ3518-101	VR, SP REC COL. LEV.
	R323	QRD161J-681	CR
	R324	–	–
	R325	QRD161J-102	CR
	R326	QRD161J-472	CR
	R327	QRD161J-274	CR
	R328	QVZ3518-223	VR, VXO
	R329	QRD161J-103	CR
	R330	QRD161J-122	CR
	R331	QRD161J-222	CR
	R332	QRD161J-103	CR
	R333	QRD161J-103	CR
	R334	QRD161J-102	CR
	R335	QRD161J-122	CR
	R336	QRD161J-471	CR
	R337	QRD161J-152	CR
	R338	QRD161J-223	CR
	R339	QRD161J-682	CR
	R340	QRD161J-102	CR
	R341	QRD161J-181	CR
	R342	QRD161J-391	CR
	R343	QRD161J-331	CR
	R344	QRD161J-223	CR
	R345	QRD161J-153	CR
	R346	QRD161J-222	CR
	R347	QRD161J-153	CR
	R348	QRD161J-103	CR
	R349	QRD161J-271	CR
	R350	–	–
	R351	QRD161J-332	CR, E/EG
	R352	QRD161J-154	CR, E/EG
	R353	QRD161J-563	CR, E/EG
	R354	QRD161J-182	CR, E/EG
	R355	QVZ3518-472	VR, SECAM DET, E/EG
	R356	QRD161J-103	CR, E/EG
	R357	QRD161J-562	CR, E/EG
	R358	QRD161J-333	CR, E/EG
	R359	QRD161J-393	CR, E/EG
	R360	QRD161J-102	CR, E/EG
	R361	QRD161J-393	CR, E/EG
	R362	QRD161J-393	CR, E/EG
	R363	QRD161J-822	CR, E/EG
	R364	QRD161J-223	CR, E/EG

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R365	QRD161J-333	CR, E/EG
	R401	QVZ3518-222	VR, INVERTED COLOUR LEVEL
	R402	QRD161J-222	CR
	R403	QRD161J-272	CR
	R404	QRD161J-821	CR
	R405	QRD161J-222	CR
	R406	QRD161J-473	CR
	R407	QRD161J-104	CR
	R408	QRD161J-391	CR
	R409	QRD161J-123	CR
	R410	QRD161J-332	CR
	R411	–	–
	R412	–	–
	R413	QRD161J-223	CR
	R414	QRD161J-103	CR
	R415	QRD161J-154	CR
	R416	QRD161J-221	CR
	R417	QRD161J-393	CR
	R418	QVZ3518-473	VR, 0.5 H D. J. DET
	R419	QRD161J-473	CR
	R420	QRD161J-122	CR
	R421	QRD161J-101	CR
	R422	QRD161J-152	CR
	R423	QRD161J-222	CR
	R424	QRD161J-561	CR
	R425	QRD161J-561	CR
	R426	QRD161J-393	CR
	R427	QRD161J-223	CR
	R428	QRD161J-471	CR
	R429	QRD161J-473	CR
	R430	–	–
	R431	QRD161J-682	CR
	R432	QRD161J-104	CR
	R433	QRD161J-473	CR
	R434	QRD161J-472	CR
	R435	QRD161J-682	CR, E/EG
	R436	QRD161J-103	CR
	R437	QRD161J-153	CR
	R438	QVZ3518-101	VR, LP REC COL. LEV.
	R439	QRD161J-822	CR, E/EG
	R440	QRD161J-102	CR
	R441	QRD161J-272	CR
	R442	QRD161J-333	CR
	R443	QRD161J-333	CR
	R444	QRD161J-103	CR
	R445	QRD161J-0R0Y	CR
	R501	QRD161J-393	CR
	R502	QRD161J-682	CR
	R503	QRD161J-393	CR
	R504	QRD161J-821	CR
	R505	QRD161J-103	CR
	R506	QRD161J-393	CR
	R507	QRD161J-821	CR
	R508	QRD161J-393	CR
	R509	QRD161J-821	CR
	R510	QRD161J-103	CR
	R511	QRD161J-103	CR
	R512	QRD161J-103	CR

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	C301	–	–
	C302	QCBB1HJ-820	C CAP
	C303	QCBB1HJ-102	C CAP
	C304	QCVB1CN-103	C CAP
	C305	QFN31HJ-473	MY CAP
	C306	QCSB1HJ-470	C CAP
	C307	–	–
	C308	–	–
	C309	–	–
	C310	–	–
	C311	QET61CM-106	E CAP
	C312	QFN31HJ-224	MY CAP
	C313	QFN31HJ-563	MY CAP
	C314	QET61CM-106	E CAP
	C315	QET61HM-225	E CAP
	C316	QET61EM-335	E CAP
	C317	QFN31HJ-473	MY CAP
	C318	QCVB1CN-103	C CAP
	C319	QET61EM-475	E CAP
	C320	QEM51AK-107	E CAP
	C321	QCVB1CN-103	C CAP
	C322	QET61HM-105	E CAP
	C323	QET61HM-475	E CAP
	C324	QET61HM-475	E CAP
	C325	QCVB1CN-103	C CAP
	C326	QCVB1CN-103	C CAP
	C327	QET61HM-105	E CAP
	C328	QFN31HJ-223	MY CAP
	C329	QCT25CH-220	C CAP
	C330	QCVB1CN-103	C CAP
	C331	QET61CM-106	E CAP
	C332	QCBB1HJ-101	C CAP
	C333	QCVB1CN-103	C CAP
	C334	QCBB1HJ-102	C CAP
	C335	QET61AM-476	E CAP
	C336	QCVB1CN-103	C CAP
	C337	QCSB1HK-5R6	C CAP
	C338	–	–
	C339	QCC11EJ-104	C CAP
	C340	QCC11EK-273	C CAP
	OR	QFN31HJ-273	MY CAP
	C341	–	–
	C342	–	–
	C343	–	–
	C344	–	–
	C345	–	–
	C346	–	–
	C347	–	–
	C348	–	–
	C349	–	–
	C350	–	–
	C351	QET61CM-476	E CAP, E/EG
	C352	QCVB1CN-103	C CAP, E/EG
	C353	QET61AM-336	E CAP, E/EG
	C354	QFN31HJ-182	MY CAP, E/EG
	C355	QFN31HJ-272	MY CAP, E/EG
	C356	QFN31HJ-223	MY CAP, E/EG
	C357	QET61CM-106	E CAP, E/EG
	C358	QCVB1CN-103	C CAP, E/EG
	C359	QCBB1HJ-102	C CAP, E/EG

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	C401	QCVB1CN-103	C CAP
	C402	QCSB1HJ-220	C CAP
	C403	QCSB1HJ-220	C CAP
	C404	QCVB1CN-103	C CAP
	C405	QCVB1CN-103	C CAP
	C406	QET61HM-105	E CAP
	C407	QET61HM-105	E CAP
	C408	QET61EM-475	E CAP
	C409	QET61HM-105	E CAP
	C410	QFN31HJ-152J	MY CAP
	C411	QFN31HJ-332	MY CAP
	C412	QCVB1CN-103	C CAP
	C413	QCVB1CN-103	C CAP
	C414	QET60JM-107	E CAP
	C415	QCVB1CN-103	C CAP
	C416	QFN31HJ-222	MY CAP
	C417	QFN31HJ-103	MY CAP
	C418	QFN31HJ-273	MY CAP
	C419	QFN31HJ-222	MY CAP
	C420	QET61HM-105	E CAP
	C421	QCVB1CN-103	C CAP
	C422	QCVB1CN-103	C CAP
	C423	QCSB1HJ-680	C CAP
	C424	QCVB1CN-103	C CAP
	C425	QCVB1CN-103	C CAP
	C426	QCVB1CN-103	C CAP
	C427	QCVB1CN-103	C CAP
	C428	–	–
	C429	–	–
	C430	–	–
	C431	QET61HM-225	E CAP
	C432	QFN31HJ-103	MY CAP
	C433	QFN31HJ-104	MY CAP
	C434	–	–
	C435	QFN31HJ-683	MY CAP
	C436	QET51AM-226	E CAP
	L301	–	–
	L302	PU48530-222J	PEAKING COIL
	L303	PU54223-271JG	PEAKING COIL
	L304	–	–
	L305	–	–
	L306	–	–
	L307	–	–
	L308	–	–
	L309	–	–
	L310	–	–
	L311	PU47051-822	PEAKING COIL
	L312	PU48530-101K	PEAKING COIL
	L313	PU48530-101K	PEAKING COIL
	L314	PU59152-150J	PEAKING COIL
	L315	PU59152-820J	PEAKING COIL
	L316	PU48530-101K	PEAKING COIL
	L351	PU49057	TRAP COIL, E/EG
	L352	PU48530-101K	PEAKING COIL, E/EG
	L353	PU47051-562	CHOKE COIL, E/EG
	L401	PU49057	TRAP COIL
	L402	PU57139	LC BLOCK
	L403	PU59152-330J	PEAKING COIL

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	L404	PU48530-101K	PEAKING COIL
	L405	PU59152-100J	PEAKING COIL
	EQ301	PU53501-7	EQUALIZER
	LPF301	PU58022	LOW PASS FILTER
	LPF302	PU54988	LOW PASS FILTER
	BPF301	PU54410-2	BAND PASS FILTER
	BPF302	PU57072	BAND PASS FILTER
	DL301	PU58971-2	2H DELAY LINE
	OR	PU59413	2H DELAY LINE
⚠	X301	PU59335	CRYSTAL
	OR	PU31449-4K	CRYSTAL
⚠	XB301	PU58023	CRYSTAL BLOCK
⚠	CF351	PU56983	CERAMIC FILTER, E/EG
	TP	PU57545	TEST PIN, TP304–306, 310, 405, 431–435, SWD 5V
	TP	PU57545	TEST PIN, TP310, E/EG
	SLD401	PU59170	CCD SHIELD (1)
	SLD402	PU59171	CCD SHIELD (2)
	SLD403	PU59172	CCD SHIELD (3)

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		PU11430D2-01	MECHACON BOARD ASS'Y [04]
	IC601	M50965-612SP	INTEGRATED CIRCUIT
	IC602	TA8400P	INTEGRATED CIRCUIT
	IC603	M54644AL	INTEGRATED CIRCUIT
	OR	M54644BL	INTEGRATED CIRCUIT
	IC604	M54644BL	INTEGRATED CIRCUIT
	Q601	2SC1317R,S	TRANSISTOR
	Q602	2SA1309R,S	TRANSISTOR
	OR	2SA933S(RS)	TRANSISTOR
	Q603	2SC2655O,YTPE6	TRANSISTOR
	OR	2SD1292T103Q,R	TRANSISTOR
	Q604	2SA1309R,S	TRANSISTOR
	OR	2SA933S(RS)	TRANSISTOR
	Q605	2SC2655O,YTPE6	TRANSISTOR
	OR	2SD1292T103Q,R	TRANSISTOR
	Q606	2SK656	D. MOS FET
	Q607	DTC124EF	D. TRANSISTOR
	Q608	2SB641R,S	TRANSISTOR
	D601	–	–
	D602	MA165	DIODE
	OR	1SS133	DIODE
	D603	MA165	DIODE
	OR	1SS133	DIODE
	D604	HZS7.5EB2	ZENER DIODE
	OR	RD7.5ES-T1B2	ZENER DIODE
	OR	MTZ7.5B	ZENER DIODE

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	D605	HZS4.7EB2	ZENER DIODE
	D606	S5688G-TPA3	DIODE
	D607	MA165	DIODE
	OR	1SS133	DIODE
	D608	HZS5.6EB1	ZENER DIODE
	OR	MTZ5.6A	ZENER DIODE
	D609	MA27WA	DIODE
	D610	MA165	DIODE
	OR	1SS133	DIODE
	D611	HZS6.8EB2	ZENER DIODE
	OR	RD6.8ES-T1B2	ZENER DIODE
	D612	HZS6.8EB2	ZENER DIODE
	OR	RD6.8ES-T1B2	ZENER DIODE
	D613	–	–
	D614	1SS133	DIODE
	OR	MA165	DIODE
	R601	QRX029J-4R7A	MFR
	R602	QRD161J-332	CR
	R603	QRD161J-223	CR
	R604	QRD161J-682	CR
	R605	QRD161J-223	CR
	R606	QRD161J-222	CR
	R607	–	–
	R608	QRD161J-103	CR
	R609	QRD161J-103	CR
	R610	QRD161J-153	CR
	R611	QRD161J-472	CR
	R612	QRD161J-103	CR
	R613	–	–
	R614	QRD161J-152	CR
	R615	QRD161J-472	CR
	R616	QRD161J-472	CR
	R617	QRD161J-472	CR
	R618	QRD161J-472	CR
	R619	QRD161J-472	CR
	R620	QRD161J-472	CR
	R621	QRD161J-124	CR
	R622	QRD161J-472	CR
	R623	QRD161J-124	CR
	R624	QRD161J-472	CR
	R625	QRD161J-472	CR
	R626	QRD161J-472	CR
	R627	QRD161J-472	CR
	R628	QRD161J-333	CR
	R629	QRD161J-472	CR
	R630	QRD161J-472	CR
	R631	QRD162J-333	CR
	R632	QRD161J-562	CR
	R633	QRD161J-102	CR
	R634	QRD161J-102	CR
	R635	QRD161J-103	CR
	R636	QRD161J-103	CR
	R637	QRD161J-102	CR
	R638	–	–
	R639	QRD161J-105	CR
	R640	–	–
	R641	–	–
	R642	QRD161J-472	CR
	R643	QRD161J-272	CR
	R644	QRD161J-393	CR
	R645	QRD161J-472	CR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R646	–	–
	R647	–	–
	R648	–	–
	R649	QRD161J-472	CR
	C601	QFV71HJ-104	MY CAP
	C602	QFV71HJ-104	MY CAP
	C603	QCF31HP-223	C CAP
	C604	QCF31HP-223	C CAP
	C605	QCSB1HJ-330	C CAP
	C606	QCSB1HJ-330	C CAP
	C607	QCBB1HJ-102	C CAP
	C608	QETA1EM-107	E CAP
	C609	QET61EM-335	E CAP
	C610	QET61CM-336	E CAP
	C611	QET61EM-475	E CAP
	C612	–	–
	C613	–	–
	C614	QEK41EM-106	C CAP
	C615	QEN41EM-475	NP E CAP
	C616	QCF11HP-223	C CAP
	C617	QFN31HJ-683	MY CAP
	C618	QFN41HJ-102	MY CAP
⚠	CF601	PU55812·	CERAMIC FILTER
	L601	PU59425	CHOKE COIL
	RA601	QRB057J-333	RESISTOR ARRAY
	RA602	QRB047J-103	RESISTOR ARRAY
	CN601	PU58931-14	CAP. HOUSING
	CN602	PU58931-10	CAP. HOUSING
	CN603	PU58931-14	CAP. HOUSING
	CN604	PU58931-8	CAP. HOUSING
	CN605	PU58931-12	CAP. HOUSING, 2–7, 9–14
	CN606	PU58931-8	CAP. HOUSING
	CN607	PU58798-17	CAP. HOUSING, 3–19
	CN608	PU58844-6	CAP. HOUSING
	FW1	PU58865-3	FLAT WIRE, FOR CN607
	J1	PW30109-50AAZZ6	PARALLEL WIRE, 2–7
	J2	PW30109-50AAZZB	PARALLEL WIRE, 4–14
	H1	PU57951	TU BOARD HINGE, x 2
	PR1	PU52105	PLASTIC RIVET
	SPC1	PQ41028-2	SPACER

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		PU11427C-3 (E/EG)	MOTHER BOARD ASS'Y [05]
		PU11427D-3 (EK)	MOTHER BOARD ASS'Y [05]
	R1	QRD182J-183	CR
	CN1	PU58930-14	CAP. HOUSING
	CN2	PU58930-14	CAP. HOUSING
	CN3	PU58930-10	CAP. HOUSING
	CN4	PU58930-14	CAP. HOUSING
	CN5	PU58930-8	CAP. HOUSING
	CN6	PU58930-12	CAP. HOUSING, 2–7, 9–14
	CN7	PU58930-8	CAP. HOUSING
	CN8	PU58930-14	CAP. HOUSING, 1–7, 9–15
	CN9	PU58930-20	CAP. HOUSING

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	CN10	PU58928-15	CAP. HOUSING, 2–16, E/EG
		PU58928-16	CAP. HOUSING, 2–17, EK
	CN11	PU58844-7R	CAP. HOUSING
	CN12	PU58844-9	CAP. HOUSING
	CN13	–	–
	CN14	PU58844-7	CAP. HOUSING
	CN15	–	–
	CN16	PU58844-7	CAP. HOUSING, 1–7, E/EG
		PU58844-8	CAP. HOUSING, EK
	CN17	PU58844-4	CAP. HOUSING, 2–5
	CN18	–	–
	CN19	–	–
	CN20	PU58844-4R	CAP. HOUSING, 1–4
	CN21	PU58844-2	CAP. HOUSING
	CN22	PU58930-22	CAP. HOUSING
	CN23	PU58928-10	CAP. HOUSING
	CN24	PU58844-12	CAP. HOUSING, 1–12

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#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22307L-03 (E)	TERMINAL BOARD ASS'Y [06]
		PU22307H-03 (EG)	TERMINAL BOARD ASS'Y [06]
		PU22369B-03 (EK)	TERMINAL BOARD ASS'Y [06]
	IC1	10VT27	INTEGRATED CIRCUIT
	Q1	2SC1740S(QRS)	TRANSISTOR
	Q2	–	–
	Q3	DTA124ES	D. TRANSISTOR, EK ONLY
	Q11	2SC1740S(QRS)	TRANSISTOR
	Q12	2SC1740S(QRS)	TRANSISTOR
	D1	MA165	DIODE
	OR	1SS133	DIODE
	D5	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	R1	QVZ3518-474	VR, V. LOCK
	R2	QRD161J-102	CR
	R3	QRD161J-102	CR
	R4	QRD161J-102	CR
	R5	QRD161J-221	CR
	R6	QRD161J-750	CR
	R7	QRD161J-750	CR
	R8	–	–
	R9	–	–
	R10	QRD161J-103	CR, EK ONLY
	R11	QRD161J-682	CR, EK ONLY
	R12	–	–
	R13	–	–
	R14	–	–
	R15	–	–
	R16	–	–
	R17	–	–
	R18	–	–
	R19	–	–
	R20	–	–
	R21	QRD161J-182	CR
	R22	QRD161J-122	CR
	R23	–	–
	R24	–	–
	R25	QRD161J-152	CR, E/EG
	R26	QRD161J-152	CR, E/EG
	R27	–	–
	R28	–	–
	R29	QRD161J-272	CR, E/EG
	R30	QRD161J-822	CR, E/EG
	R31	QRD161J-104	CR, E/EG
	R32	–	–
	R33	–	–
	R34	–	–
	R35	QRD161J-223	CR, E/EG
	R36	QRD161J-273	CR, EK ONLY
	R37	QRD161J-682	CR
	R38	QRD161J-681	CR
	R39	–	–
	R40	QRD161J-183	CR
	R41	–	–
	R42	QRD161J-102	CR
	R43	QRD161J-103	CR
	R44	QRD161J-682	CR
	R45	–	–
	R46	–	–
	R47	–	–
	R48	–	–
	R49	–	–
	R50	–	–
	R51	–	–
	R52	–	–
	R53	–	–
	R54	–	–
	R55	QRD161J-332	CR
	C1	QEK61CM-476	E CAP
	C2	QEK61CM-476	E CAP
	C3	QETC0JM-477	E CAP
	C4	QET61CM-476	E CAP
	C5	QET61CM-476	E CAP
	C6	QEK61CM-476	E CAP
	C21	QCBB1HJ-102	C CAP
	C22	QCBB1HJ-102	C CAP
	L1	PU48530-101K	PEAKING COIL, 100 μH
	EQ1	PU54838	EQUALIZER
	CN1	PU58929-15	CAP. HOUSING, 2–16, E/EG
		PU58929-16	CAP. HOUSING, 2–17, EK
	CN2	–	–
	CN3	PU58962-6	CAP. HOUSING
⚠	TML1	PU59260-2	TERMINAL BOARD, EG
⚠	TML1	PU59260-11	TERMINAL BOARD, E
⚠	TML1	PU59260-12	TERMINAL BOARD, EK

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22276AB-2(E/EG)	TUNER/IF BOARD ASS'Y [07]
		PU22276C-2 (EK)	TUNER/IF BOARD ASS'Y [07]
⚠	IC1	M51365SP	INTEGRATED CIRCUIT
	IC2	M50440-391SP	INTEGRATED CIRCUIT
	IC3	M58655P	INTEGRATED CIRCUIT
	Q1	2SC3354S,T	TRANSISTOR
	Q2	2SD1468S(RS)	TRANSISTOR
	OR	2SD1450S,T	TRANSISTOR
	Q3	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTRO, EK ONLY
	Q4	2SC1740S(RS)	TRANSISTOR, E/EG
	Q5	2SA933S(RS)	TRANSISTOR
	OR	2SA1309R,S	TRANSISTOR
	Q6	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR
	Q7	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR
	Q8	–	–
	Q9	2SB808(FG)	TRANSISTOR, E/EG
	Q10	2SB808(FG)	TRANSISTOR, E/EG
	Q11	2SB808(FG)	TRANSISTOR, E/EG
	Q12	2SB808(FG)	TRANSISTOR, E/EG
	Q13	2SK381	FET
	Q14	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR, EK ONLY
	Q15	2SD1292T103Q,R	TRANSISTOR
	OR	2SC2655O, YTPE6	TRANSISTOR
	Q16	2SD1292T103Q,R	TRANSISTOR
	OR	2SC2655O, YTPE6	TRANSISTOR
	Q17	2SB1010(QR)	TRANSISTOR, E/EG
		2SB810H,J	TRANSISTOR, EK
	Q18	DTA124ES	D. TRANSISTOR
	Q19	–	–
	Q20	–	–
	Q21	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR
	Q22	2SA933S(RS)	TRANSISTOR
	OR	2SA1309R,S	TRANSISTOR, EK ONLY
	Q23	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR, EK ONLY
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D3	1SS133	DIODE
	D4	1SS133	DIODE
	D5	1SS133	DIODE
	D6	HZ30-2	ZENER DIODE
	D7	MTZ10B	ZENER DIODE
	OR	RD10ES-T1B2	ZENER DIODE
	D8	1SS133	DIODE
	D9	MTZ7.5B	ZENER DIODE
	OR	RD7.5ES-T1B2	ZENER DIODE
	D10	E-452-2	C.R. DIODE
	D11	RD6.2ES-T1B1	ZENER DIODE
	OR	HZS6.2EB1	ZENER DIODE, E/EG
	D12	1SS133	DIODE, E/EG
	R1	QRD161J-151	CR, E/EG
		QRD161J-750	CR, EK

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R2	QRD161J-103	CR, E/EG
		QRD161J-472	CR, EK
	R3	QRD161J-152	CR
	R4	QRD161J-470	CR
	R5	QRD161J-331	CR
	R6	QRD161J-681	CR
	R7	QRD161J-101	CR
	R8	QRD161J-100	CR, E/EG
		QRD161J-470	CR, EK
	R9	QRD161J-332	CR, EK ONLY
	R10	QRD161J-824	CR
	R11	QVZ3518-472	VR, AGC
	R12	QRD161J-222	CR
	R13	QRD161J-562	CR
	R14	QRD161J-332	CR
	R15	QRD161J-331	CR, E/EG
	R16	QVZ3518-103	VR, Y. LEVEL, E/EG
		QRD161J-222	CR, EK
	R17	QRD161J-331	CR
	R18	QRD161J-561	CR
	R19	QRD161J-470	CR
	R20	QRD161J-561	CR
	R21	–	–
	R22	–	–
	R23	QRD161J-473	CR, E/EG
	R24	–	–
	R25	QRD161J-471	CR
	R26	QRD161J-681	CR
	R27	QRD161J-681	CR
	R28	QRD161J-331	CR, E/EG
		QRD161J-391	CR, EK
	R29	QRD161J-332	CR
	R30	QRD161J-103	CR
	R31	QRD161J-222	
	R32	–	–
	R33	QRD162J-472	CR
	R34	QRD161J-103	CR
	R35	–	–
	R36	–	–
	R37	–	–
	R38	–	–
	R39	–	–
	R40	QRD161J-182	CR
	R41	QRD161J-272	CR
	R42	QVZ3518-103	VR, COLOUR LEVEL
	R43	QRD161J-123	CR
	R44	QRD161J-123	CR
	R45	QRD161J-331	CR
	R46	QRD161J-222	CR
	R47	–	–
	R48	–	–
	R49	–	–
	R50	QRD161J-680	CR, E/EG
	R51	QRD161J-222	CR, E/EG
	R52	QRD161J-471	CR
	R53	QRD162J-103	CR
	R54	QRD161J-332	CR
	R55	QRD161J-680	CR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R56	QRD161J-223	CR
	R57	QRD161J-471	CR
	R58	QRD161J-102	CR
	R59	QRD161J-223	CR
	R60	QRD161J-103	CR
	R61	QRD161J-334	CR
	R62	QRD161J-103	CR
	R63	QRD161J-331	CR
	R64	–	–
	R65	–	–
	R66	–	–
	R67	–	–
	R68	–	–
	R69	–	–
	R70	–	–
	R71	–	–
	R72	–	–
	R73	–	–
	R74	–	–
	R75	QRD161J-472	CR, E/EG
	R76	QRD161J-103	CR, E/EG
	R77	QRD161J-153	CR, E/EG
	R78	QRD161J-472	CR, E/EG
	R79	QRD161J-103	CR, E/EG
	R80	QRD161J-153	CR, E/EG
	R81	QRD161J-472	CR, E/EG
	R82	QRD161J-103	CR, E/EG
	R83	QRD161J-153	CR, E/EG
	R84	QRD161J-472	CR, E/EG
	R85	QRD161J-103	CR, E/EG
	R86	QRD161J-153	CR, E/EG
	R87	QRD161J-104	CR
	R88	QRD161J-153	CR
	R89	–	–
	R90	–	–
	R91	QRD161J-472	CR
	R92	QRD161J-562	CR
	R93	QRD161J-152	CR
	R94	QRD161J-472	CR
	R95	QRD161J-121	CR
	R96	QRD161J-103	CR
	R97	QRD161J-103	CR
	R98	QRD161J-153	CR
	R99	–	–
	R100	QRD161J-101	CR
	R101	QRD161J-222	CR
	R102	QRD161J-222	CR
	R103	QRD161J-222	CR
	R104	QRD161J-222	CR
	R105	QRD161J-222	CR
	R106	QRD161J-102	CR
	R107	QRD161J-222	CR
	R108	QRD161J-103	CR, E/EG
	R109	–	–
	R110	QRD161J-104	CR
	R111	–	–
	R112	QRD161J-222	CR
	R113	–	–
	R114	–	–

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R115	–	–
	R116	–	–
	R117	–	–
	R118	–	–
	R119	–	–
	R120	–	–
	R121	–	–
	R122	QRD161J-103	CR
	R123	QRD161J-103	CR
	R124	QRD161J-103	CR
	R125	QRD161J-103	CR
	R126	QRD161J-103	CR
	R127	QRD161J-473	CR
	R128	QRD161J-473	CR
	R129	–	–
	R130	QRD161J-471	CR
	R131	QRD161J-102	CR
	R132	–	–
	R133	QRD161J-103	CR
	R134	QRD161J-102	CR, E/EG
		QRD161J-182	CR, EK
	C1	QCSB1HJ-100	C CAP, E/EG
	C2	QCBB1HK-102	C CAP
	C3	QCXB1CK-222	C CAP
	C4	QCBB1HK-102	C CAP
	C5	QCBB1HK-102	C CAP
	C6	–	–
	C7	PU57601-474ME	OS CAP
	C8	QET61CM-336	E CAP
	C9	QCXB1CK-222	C CAP
	C10	QCSB1HJ-330	C CAP, EK ONLY
	C11	QET61HM-474	E CAP
	C12	QCT25PH-270	C CAP, E/EG
		QCT25RH-220	C CAP, EK
	C13	QCXB1CK-222	C CAP
	C14	QET61CM-336	E CAP
	C15	–	–
	C16	–	–
	C17	–	–
	C18	–	–
	C19	QET61CM-336	E CAP
	C20	QCXB1CK-222	C CAP
	C21	QCF31HP-223	C CAP
	C22	QCSB1HJ-100	C CAP
	C23	QET61HM-105	E CAP
	C24	QCC11EK-223	C CAP
	C25	QET61HM-105	E CAP
	C26	–	–
	C27	QEK61HM-474	E CAP
	C28	–	–
	C29	–	–
	C30	QET61CM-336	E CAP
	C31	QCSB1HJ-470	C CAP
	C32	–	–
	C33	–	–
	C34	QET61CM-336	E CAP, E/EG
	C35	QET61CM-106	E CAP

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	C36	QCC11EK-223	C CAP
	C37	QET61HM-474	E CAP
	C38	–	–
	C39	QCC11EK-104	C CAP
	C40	QET61CM-106	E CAP, E/EG
	C41	QET61CM-106	E CAP, E/EG
	C42	QET61CM-106	E CAP, E/EG
	C43	QET61CM-106	E CAP, E/EG
	C44	QET61HM-225	E CAP
	C45	–	–
	C46	QFV81HJ-474	MY CAP
	OR	QFZ9011-474	MP CAP
	C47	QFN31HJ-223	MY CAP
	C48	QCBB1HK-102	C CAP, E/EG
	C49	QCBB1HK-102	C CAP
	C50	–	–
	C51	QCT25CH-220	C CAP
	C52	QCT25CH-270	C CAP
	C53	QCVB1CM-103	C CAP
	C54	PU57601-335MC	OS CAP
	C55	QET61CM-106	E CAP
	C56	QET61CM-336	E CAP
	C57	QET61CM-107	E CAP
	C58	QCBB1HK-102	C CAP
	C59	QET61AM-336	E CAP
	C60	QET61AM-107	E CAP
	C61	QET61AM-106	E CAP
	C62	–	–
	C63	QET61HM-106	E CAP
	C64	–	–
	C65	QET61CM-336	E CAP
	L1	–	–
	L2	PU57717-1R0J	PEAKING COIL, E/EG
		PU57717-1R2	PEAKING COIL, EK
	L3	PU57717-1R5J	PEAKING COIL, E/EG
		PU57717-1R5	PEAKING COIL, EK
	L4	PU59152-6R8K	PEAKING COIL
	L5	PU59152-120J	PEAKING COIL, E/EG
		PU59152-150J	PEAKING COIL, EK
	L6	PU59152-6R8K	PEAKING COIL
	L7	PU59152-6R8K	PEAKING COIL
	L8	PU59152-220J	PEAKING COIL
	L9	–	–
	L10	PU59152-100J	PEAKING COIL
	L11	PU59152-R22J	PEAKING COIL, E/EG
	OR	PU49994-R22	PEAKING COIL, E/EG
	L12	–	–
	L13	PU53223-101J	PEAKING COIL, E/EG
	T1	PU59402	TRAP COIL, FTZ, E/EG
	T2	PU59308	COIL, VCO
	T5	PU55184	I.F.T., SYNC DET.
⚠	TNR1	PU36155-1-2	U/V TUNER, E
⚠	TNR1	PU36155-1-1	U/V TUNER, EG
⚠	TNR1	PU36180	UHF TUNER, EK
⚠	X1	PU58554-2	CRYSTAL
	SAW1	PU35557-4	SAW FILTER, E/EG
	SAW1	PU32987-4	SAW FILTER, EK

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
⚠	CF1	PU57707-2	CERAMIC FILTER, S5.5, E/EG
⚠		PU57707	CERAMIC FILTER, S6.0, EK
⚠	CF2	PU59242-2	CERAMIC FILTER, 5.5 MC29, E/EG
⚠		PU59242-3	CERAMIC FILTER, 6.0 MC29, EK
⚠	CF3	PU32990-2	CERAMIC FILTER, T5.5, E/EG
⚠		PU32990-3	CERAMIC FILTER, T6.0, EK
	RA1	QRB047J-104	RESISTOR ARRAY
	SLD1	PQ31327	SHIELD CASE
	SLD2	PQ31328	SHIELD COVER, E/EG
	SLD3	PQ42506	SHIELD PLATE, E/EG
⚠	RF1	PU59241M-2	RF CONV. & MIX BOOSTER, E/EG
⚠	RF1	PU59262S	RF CONV. & MIX BOOSTER, EK
	CN3	PU58844-3	CAP. HOUSING, E/EG

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		PU22283B-1	SERVO BOARD ASS'Y [08]
	IC1	M51796P	INTEGRATED CIRCUIT
	IC2	VC2023A	INTEGRATED CIRCUIT
	IC3	UPC324C	INTEGRATED CIRCUIT
	OR	IR3702	INTEGRATED CIRCUIT
	Q1	2SD636R,S	TRANSISTOR
	OR	2SC1740S(QRS)	TRANSISTOR
	Q2	2SB641R,S	TRANSISTOR
	OR	2SA933S	TRANSISTOR
	Q3	2SD636R,S	TRANSISTOR
	OR	2SC1740S(QRS)	TRANSISTOR
	Q4	2SB641R,S	TRANSISTOR
	OR	2SA933S	TRANSISTOR
	Q5	DTC144ES	D. TRANSISTOR
	Q6	DTC144WS	D. TRANSISTOR
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D3	1SS133	DIODE
	D4	–	–
	D5	–	–
	D6	–	–
	D7	1SS133	DIODE
	D8	1SS133	DIODE
	D9	–	–
	D10	MTZ12B	ZENER DIODE
	D11	–	–
	D12	1SS133	DIODE
	D13	MTZ5.1B	ZENER DIODE
	D14	–	–
	D15	1SS133	DIODE
	D16	1SS133	DIODE
	R1	QRD161J-681	CR
	R2	QRD161J-102	CR
	R3	QRD161J-331	CR
	R4	QRD161J-684	CR
	R5	QRD161J-102	CR
	R6	QRD161J-103	CR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R7	QRD161J-564	CR
	R8	QRD161J-103	CR
	R9	QRD161J-105	CR
	R10	QRD161J-103	CR
	R11	QRD161J-681	CR
	R12	QRD161J-103	CR
	R13	QRD161J-103	CR
	R14	–	–
	R15	QRD161J-101	CR
	R16	QRD161J-473	CR
	R17	QRD161J-473	CR
	R18	QRD161J-473	CR
	R19	QRD161J-473	CR
	R20	QRD161J-473	CR
	R21	QRD161J-473	CR
	R22	QRD161J-105	CR
	R23	QRD161J-473	CR
	R24	QRD161J-473	CR
	R25	QRD161J-564	CR
	R26	QRD161J-683	CR
	R27	QRD161J-105	CR
	R28	QRD161J-105	CR
	R29	QRD161J-273	CR
	R30	QRD161J-102	CR
	R31	QRD161J-103	CR
	R32	QRD161J-103	CR
	R33	–	–
	R34	QRD161J-333	CR
	R35	QVZ3521-474	VR, PB SW POINT
	R36	QRD161J-103	CR
	R37	–	–
	R38	–	–
	R39	QRD161J-393	CR
	R40	–	–
	R41	–	–
	R42	–	–
	R43	–	–
	R44	–	–
	R45	QRD161J-103	CR
	R46	QVZ3521-474	VR, CTL HEAD POSITION
	R47	QRD161J-103	CR
	R48	–	–
	R49	–	–
	R50	–	–
	R51	–	–
	R52	–	–
	R53	–	–
	R54	–	–
	R55	QRD161J-472	CR
	R56	QRD161J-103	CR
	R57	QRD161J-822	CR
	R58	QRD161J-562	CR
	R59	QRD161J-104	CR
	R60	QRD161J-104	CR
	R61	QRD161J-153	CR
	R62	QRD161J-102	CR
	R63	QRD161J-105	CR
	R64	QRD161J-333	CR
	R65	QRD161J-101	CR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R66	QRD161J-222	CR
	R67	QRD161J-332	CR
	R68	QRD161J-105	CR
	R69	QRD161J-223	CR
	R70	QRD161J-104	CR
	R71	–	–
	R72	–	–
	R73	QRD161J-103	CR
	R74	QRD161J-472	CR
	R75	QRD161J-103	CR
	R76	–	–
	R77	–	–
	R78	QRD161J-185	CR
	C1	QCBB1HJ-102	C CAP
	C2	QET61AM-476	E CAP
	C3	QET61CM-106	E CAP
	C4	QET61CM-106	E CAP
	C5	QET61AM-476	E CAP
	C6	QFV71HJ-104	MY CAP
	C7	QCBB1HJ-102	C CAP
	C8	QET61HM-475	E CAP
	C9	QCBB1HJ-101	C CAP
	C10	QCBB1HJ-102	C CAP
	C11	QET61CM-106	E CAP
	C12	QCSB1HJ-330	C CAP
	C13	QCSB1HJ-330	C CAP
	C14	QCVB1CN-103	C CAP
	C15	QFV71HJ-223	MY CAP
	C16	QCXB1CN-472	C CAP
	C17	QCXB1CN-472	C CAP
	C18	–	–
	C19	QFV71HJ-473	MY CAP
	C20	QFV71HJ-473	MY CAP
	C21	QFV71HJ-473	MY CAP
	C22	QFV71HJ-473	MY CAP
	C23	QCXB1CN-472	C CAP
	C24	QCXB1CN-472	C CAP
	C25	QET61EM-475	E CAP
	C26	QET61EM-475	E CAP
	C27	QET61CM-106	E CAP
	C28	QET61CM-106	E CAP
	C29	QFN31HJ-682	MY CAP
	C30	QFN31HJ-102	MY CAP
	C31	QFV71HJ-104	MY CAP
	C32	–	–
	C33	QFV71HJ-154	MY CAP
	C34	–	–
	C35	QFV71HJ-154	MY CAP
	C36	QCXB1CN-472	C CAP
	C37	QET61CM-106	E CAP
	C38	QCVB1CN-103	C CAP
	C39	QEN61HM-105	NP E CAP
	C40	QCBB1HJ-102	C CAP
	C41	QET61HM-225	E CAP
	C42	QCBB1HJ-102	C CAP
	C43	QEN61HM-105	NP E CAP
	C44	QET61HM-225	E CAP
	C45	QCBB1HJ-102	C CAP
⚠	X1	PU59335	CRYSTAL

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	CN1	PU58844-2	CAP. HOUSING
	CN2	PU43351-105	CAP. HOUSING
	CN3	PU58844-5	CAP. HOUSING
	CN4	PU58931-14	CAP. HOUSING
	CN5	PU58931-20	CAP. HOUSING
	TP	PU55774	TEST PIN, TP1, 11, 25, GND
	CL1	PU56729-2	WIRE CLAMP

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# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU36160B-2	AUDIO BOARD ASS'Y [09]
	IC1	AN3994K	INTEGRATED CIRCUIT
	Q1	2SD1449S,T	TRANSISTOR
	Q2	2SD1449S,T	TRANSISTOR
	Q3	2SC3311R,S	TRANSISTOR
	Q4	2SB1030R,S	TRANSISTOR
	Q5	DTA144ES	D. TRANSISTOR
	Q6	DTC124ES	D. TRANSISTOR
	D1	MA165	DIODE
	OR	1SS133	DIODE
	D2	MA165	DIODE
	OR	1SS133	DIODE
	D3	MA165	DIODE
	OR	1SS133	DIODE
	D4	MA165	DIODE
	OR	1SS133	DIODE
	D5	MA165	DIODE
	OR	1SS133	DIODE
	D6	MA165	DIODE
	OR	1SS133	DIODE
	R1	QRD161J-103	CR
	R2	QRD161J-124	CR
	R3	QRD161J-223	CR
	R4	QRD161J-331	CR
	R5	QVZ3518-102	VR, PB LEVEL
	R6	QRD161J-100	CR
	R7	QRD161J-471	CR
	R8	QRD161J-303	CR
	R9	QRD161J-470	CR
	R10	–	–
	R11	QRD161J-563	CR
	R12	QRD161J-271	CR
	R13	QRD161J-153	CR
	R14	QRD161J-153	CR
	R15	QRD161J-103	CR
	R16	QRD161J-103	CR
	R17	QRD161J-103	CR
	R18	QRD161J-331	CR
	R19	QRD161J-103	CR
	R20	QVZ3518-473	VR, BIAS LEVEL
	R21	QRD161J-8R2	CR
	R22	QRD161J-333	CR
	R23	QRD161J-4R7	CR
	R24	QRD161J-223	CR
	R25	–	–
	R26	–	–
	R27	–	–
	R28	–	–
	R29	–	–
	R30	–	–
⚠	R31	PU58802-4R7	POSISTOR
	OR	PU52108-4R7	POSISTOR
	R32	QRD161J-0R0	CR
	C1	QER61EM-475G	E CAP
	C2	QER61HM-474G	E CAP
	C3	QFV71HJ-224	MY CAP
	C4	QFN31HJ-123	MY CAP
	C5	QEK41HM-105	E CAP
	C6	QCBB1HJ-102	C CAP
	C7	QFN31HJ-152	MY CAP
	C8	QER61CM-226	E CAP
	C9	QER61EM-335G	E CAP
	C10	QER61CM-476	E CAP
	C11	QER61CM-106G	E CAP
	C12	QCBB1HJ-331	C CAP
	C13	QFN31HJ-683	MY CAP
	C14	QFN31HJ-683	MY CAP
	C15	QER61HM-225G	E CAP
	C16	QCBB1HJ-102	C CAP
	C17	QER60JM-476	E CAP
	C18	QER61AM-476	E CAP
	C19	QCBB1HJ-331	C CAP
	C20	QFP32AJ-683	PP CAP
	C21	QER61CM-106G	E CAP
	C22	QFN31HJ-332	MY CAP
	C23	QFN31HJ-223	MY CAP
	C24	QCVB1CN-103	C CAP
	C25	QER61HM-104G	E CAP
	C26	QER61CM-106G	E CAP
	L1	PU58308-272J	PEAKING COIL
⚠	T1	PU59307	OSC. TRANS.
	TP	PU55774	TEST PIN, TP31, 32
	CN1	PU58844-7	CAP. HOUSING
	CN2	PU58844-4	CAP. HOUSING
	CN3	PU58844-7	CAP. HOUSING

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# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
			A/CTL HEAD BOARD [12]
		PU58016	A/CTL HEAD BOARD
	CN1	PU54537-5	CAP. HOUSING
	CN2	PU54537-2	CAP. HOUSING
	BKT1	PQ42518	BRACKET
	SCR1	SPSH1740	SCREW

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
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		PU22357A-02 (E/EG)	TIMER BOARD ASS'Y [15]
		PU22357B-02 (EK)	TIMER BOARD ASS'Y [15]
	IC1	M5278L56	INTEGRATED CIRCUIT
	IC2	S-8053HLB	INTEGRATED CIRCUIT
	IC101	UPD75208CW-030	INTEGRATED CIRCUIT
		UPD75208CW-024	INTEGRATED CIRCUIT, EK ONLY
	IC102	UPD82C43CY	INTEGRATED CIRCUIT
	Q1	–	–
	Q2	2SC1685R,S	TRANSISTOR
	Q3	2SC1685R,S	TRANSISTOR
	Q105	DTC124ES	D. TRANSISTOR
	Q106	–	–
	Q107	DTC124ES	D. TRANSISTOR
	D1	–	–
	D2	–	–
	D3	1SS133	DIODE
	D4	–	–
	D5	RD9.1ES-T1B2	ZENER DIODE
	D6	1SS133	DIODE
⚠	D10	HZ7B	ZENER DIODE
	D103	1SS133	DIODE
	R1	–	–
	R2	QRD161J-103	CR
	R3	QRD161J-682	CR
	R4	QRD161J-471	CR
	R5	QRD161J-104	CR
	R6	QRD161J-684	CR
	R7	QRD161J-102	CR
	R8	QRD161J-474	CR
	R9	–	–
	R10	–	–
	R11	QRD161J-104	CR
	R12	–	–
	R13	–	–
	R14	QRD161J-151	CR
	R15	–	–
	R16	–	–
	R17	–	–
	R18	QRD161J-472	CR
	R101	QRD161J-472	CR
	R102	QRD161J-472	CR
	R103	QRD161J-472	CR
	R104	QRD161J-472	CR
	R105	QRD161J-103	CR
	R106	QRD161J-103	CR
	R107	QRD161J-103	CR
	R108	QRD161J-103	CR
	R109	QRD161J-102	CR
	R110	QRD161J-472	CR
	R111	QRD161J-472	CR
	R112	–	–
	R113	QRD161J-472	CR
	R114	QRD161J-472	CR
	R115	QRD161J-472	CR
	R116	QRD161J-472	CR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R117	QRD161J-472	CR
	R118	QRD161J-472	CR
	R119	QRD161J-472	CR
	R120	QRD161J-472	CR
	R121	QRD161J-472	CR
	R122	QRD161J-472	CR
	R123	QRD161J-103	CR
	R124	–	–
	R125	QRD161J-472	CR
	R126	–	–
	R127	–	–
	R128	–	–
	R129	–	–
	R130	QRD161J-472	CR
	R131	QRD161J-472	CR
	R132	QRD161J-472	CR
	R133	QRD161J-472	CR
	R134	QRD161J-472	CR
	R135	QRD161J-472	CR
	R136	QRD161J-472	CR
	R137	QRD161J-472	CR
	R138	QRD161J-472	CR
	R139	QRD161J-472	CR
	R140	QRD161J-472	CR
	R141	QRD161J-472	CR
	R142	QRD161J-472	CR
	R143	QRD161J-472	CR
	R144	QRD161J-472	CR
	R145	QRD161J-472	CR, E/EG
	R146	QRD161J-472	CR, E/EG
	R147	QRD161J-472	CR, E/EG
	R148	QRD161J-472	CR, E/EG
	R149	QRD161J-472	CR
	R150	QRD161J-472	CR
	R151	–	–
	R152	–	–
	R153	–	–
	R154	QRD161J-472	CR
	R155	QRD161J-334	CR
	R156	QRD161J-222	CR
	R157	–	–
	R158	QRD161J-333	CR
	C1	QETC1EM-107	E CAP
	C2	QCVB1CM-103	C CAP
	C3	QETC1CM-107	E CAP
	C4	QETC1CM-336	E CAP
	C5	QCBB1HJ-102	C CAP
	C6	QCVB1CM-103	C CAP
	C7	QETC1CM-106	E CAP
	C8	PU59421-104	E CAP, BACK UP
	C101	–	–
	C102	PU57672-500	TR CAP, TIMER CLOCK
	C103	QCSB1HJ-270	C CAP
	C104	QCVB1CM-103	C CAP
	C105	QCVB1CM-103	C CAP
	C106	QCC11EK-682	C CAP
	RA101	RNBH7A104	RESISTOR NETWORK
	RA102	–	–
	RA103	RNBH5A333	RESISTOR NETWORK
	RA104	RNBH8A224	RESISTOR NETWORK

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	RA105	RNBH7A104	RESISTOR NETWORK
	RA106	RNBH5A224	RESISTOR NETWORK
	L 1	PU48530-101	PEAKING COIL
⚠	X101	PU58394	CRYSTAL
⚠	CF101	PU58428	CERAMIC FILTER
⚠	OR	PU59576	CERAMIC FILTER
	CN1	PU58931-22	CAP. HOUSING
	CN2	PU58929-10	CAP. HOUSING
	CN3	PU58844-106	CAP. HOUSING
	CN4	PU43351-104	CAP. HOUSING, E/EG
	CL101	PU59154	WIRE CLAMP
	TP	PU56008	TEST PIN, TP1–3

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#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU11406C-4 (E/EG)	OPERATION BOARD ASS'Y [22]
		PU11406D-4 (EK)	OPERATION BOARD ASS'Y [22]
	D201	SLR-34VC3F	LED, POWER
	R201	QRD161J-102	CR
	R202	QRD161J-104	CR
	R203	QRD161J-223	CR
	R204	–	–
	R205	QRD161J-120	CR
	R206	–	–
	R207	QRD161J-152	CR
	R208	QRD161J-222	CR
	R209	QRD161J-222	CR
	R210	–	–
	R211	–	–
	R212	–	–
	R213	QRD161J-331	CR
	R214	–	–
	R215	QRD161J-222	CR
	R216	QRD161J-222	CR
	R217	QRD161J-332	CR
	R218	QRD161J-472	CR
	R219	CRD161J-103	CR
	R401	PU57925	VR, TRACKING
	R402	PU59166	VR, P. SHARPNESS
	C201	QCBB1HJ-471	C CAP
	C202	QFN41HJ-273	MY CAP
	C203	QEK61EM-475G	E CAP
	C204	QEK61HM-225G	E CAP
	C205	–	–
	C206	QEK61AM-476	E CAP
	S201	PU57550	TACT SW, POWER
	S202	PU57550	TACT SW, EJECT
	S203	–	–
	S204	PU57551	TACT SW, STOP
	S205	PU57551	TACT SW, PAUSE
	S206	PU57551	TACT SW, PLAY
	S207	PU57551	TACT SW, REW
	S208	PU57551	TACT SW, FF
	S209	PU57551	TACT SW, RECORD
	HD201	PQM30038	LED HOLDER, D201

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION

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#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU58006B (E/EG)	IFR BOARD ASS'Y
		PU58006E (EK)	IFR BOARD ASS'Y
	IC1	LA7224	INTEGRATED CIRCUIT, E/EG
		LA7225	INTEGRATED CIRCUIT, EK
	D4	PD49PI	PIN PHOTO DIODE
	R7	QRD161J-104	CR
	R9	QRD161J-102	CR
	C5	QEK60JM-476	E CAP
	L1	PU59060	TRAP COIL
	CN1	PU58844-104	CAP. HOUSING, 2–5
	CN2	PU58844-107	CAP. HOUSING, E/EG
		PU58844-108	CAP. HOUSING, EK
	SLD1	PQ30658	SHIELD CASE
	SLD2	PQ30645	SHIELD PLATE
	CL1	PU56729-2	WIRE CLAMP, x 2

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#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22339B (E/EK)	SWITCH/DISPLAY BOARD ASS'Y [28]
		PU22339A (EG)	SWITCH/DISPALY BOARD ASS'Y [28]
	IC1	UPD7538ACU-201	INTEGRATED CIRCUIT
	D1	RD8.2EB2	ZENER DIODE
	D2	1SS132	DIODE
	D3	1SS132	DIODE
	D4	1SS132	DIODE
	D5	1SS132	DIODE
	D402	1SS132	DIODE
	R1	QRD161J-103	CR
	R2	QRD161J-102	CR
	R3	QRD161J-102	CR
	R4	QRD161J-102	CR
	R5	QRD161J-103	CR
	R6	QRD161J-472	CR
	R7	QRD161J-273	CR
	R8	QRD161J-104	CR
	R9	QRD161J-102	CR
	R10	QRD161J-102	CR
	C1	QCBB1HJ-101	C CAP
	C2	QCBB1HJ-101	C CAP
	C3	QER61HM-106	E CAP
	C4	QCVB1CN-103	C CAP
	C5	QER61HM-106	E CAP
	C6	QCF11HP-103	C CAP
	C7	QCBB1HJ-102	C CAP
	RA1	RNBHGA104	RESISTOR NETWORK
	RA2	RNBHBA104	RESISTOR NETWORK
⚠	CF1	PU59109	CERAMIC FILTER

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	S1	PU53598	TACT SWITCH, 1/SUN
	S2	PU53598	TACT SWITCH, 2/MON
	S3	PU53598	TACT SWITCH, 3/TUE
	S4	PU53598	TACT SWITCH, 4/WED
	S5	PU53598	TACT SWITCH, 5/THU
	S6	PU53598	TACT SWITCH, 6/FRI
	S7	PU53598	TACT SWITCH, 7/SAT
	S8	PU53598	TACT SWITCH, 8/DAILY
	S9	PU53598	TACT SWITCH, 9/REPEAT
	S10	PU53598	TACT SWITCH, 0/AUX
	S11	PU53598	TACT SWITCH, GO TO
	S12	–	–
	S13	PU53598-2	TACT SWITCH, RESET
	S14	PU53598-2	TACT SWITCH, CNT/REMAIN
	S15	PU53598	TACT SWITCH, INSTANT REC
	S16	PU53598-2	TACT SWITCH, TIMER
	S17	PU53598	TACT SWITCH, CH UP
	S18	PU53598	TACT SWITCH, CH DOWN
	S19	PU53598-2	TACT SWITCH, SEARCH
	S20	PU53598-2	TACT SIWTCH, VPS/CH
	S21	PU53598-2	TACT SWITCH, CANC/SKIP
	S22	PU53598-2	TACT SWITCH, STORE
	S23	PU53598-2	TACT SWITCH, FINE +
	S24	PU53598-2	TACT SWITCH, FINE –
	S25	PU53598-2	TACT SWITCH, CLOCK/ADJ
	S26	PU53598-2	TACT SIWTCH, PROGRAM
	S27	PU53598-2	TACT SWITCH, SP/LP
	S28	–	–
	S29	PU53598-2	TACT SWITCH, CUR +
	S30	PU53598-2	TACT SWITCH, CUR –
	S402	PU52621	PUSH SWITCH, MEMORY
	TP	PU56008	TEST PIN, TP1
	FDP1	PU58960-3	FDP, E/EK
		PU58960-4	FDP, EG
	HD1	PQ31355	FDP HOLDER, R
	HD2	PQ31356	FDP HOLDER, L

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UPPER DRUM BOARD [41]

		PDM3018	UPPER DRUM BOARD

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		PU36147B-02	PRE/REC AMP BOARD ASS'Y [43]
	IC1	HA11870NT	INTEGRATED CIRCUIT
	Q1	DTC144WS	D. TRANSISTOR
	Q2	DTC144WS	D. TRANSISTOR
	Q3	2SA1309R,S	TRANSISTOR
	Q4	DTC144WS	D. TRANSISTOR
	Q5	DTC144WS	D. TRANSISTOR
	Q6	2SC1740S(QRS)	TRANSISTOR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	D1	MA150	DIODE
	OR	1SS133	DIODE
	D2	MA150	DIODE
	OR	1SS133	DIODE
	D3	MA150	DIODE
	OR	1SS133	DIODE
	D4	MA150	DIODE
	OR	1SS133	DIODE
	D5	MA150	DIODE
	OR	1SS133	DIODE
	R1	QVZ3518-221	VR, SP CH-2 Q
	R2	PU57457-221	VR, SP CH-1 Q
	R3	QVZ3518-221	VR, LP CH-1 Q
	R4	PU57457-221	VR, LP CH-2 Q
	R5	QRD161J-184	CR
	R6	–	–
	R7	–	–
	R8	QRD161J-393	CR
	R9	QRD161J-103	CR
	R10	QRD161J-153	CR
	R11	QRD161J-103	CR
	R12	QRD161J-103	CR
	R13	QRD161J-103	CR
	R14	QRD161J-223	CR
	R15	QRD161J-103	CR
	R16	–	–
	R17	QRD161J-152	CR
	R18	QRD161J-332	CR
	R19	QRD161J-561	CR
	R20	QRD161J-561	CR
	R21	QRD161J-561	CR
	R22	QRD161J-474	CR
	R23	QRD161J-223	CR
	R24	QRD161J-223	CR
	C1	QCVB1CN-103	C CAP
	C2	QFZ0096-224	MP CAP
	C3	QFZ0096-224	MP CAP
	C4	QCSB1HJ-220	C CAP
	C5	PU57672-500	TR CAP, SP CH-2 FO
	C6	QCSB1HJ-390	C CAP
	C7	PU57672-500	TR CAP, SP CH-1 FO
	C8	QCVB1CN-103	C CAP
	C9	QCVB1CN-103	C CAP
	C10	QFZ0096-224	MP CAP
	C11	QFZ0096-224	MP CAP
	C12	QCSB1HJ-330	C CAP
	C13	PU57672-500	TR CAP, LP CH-1 FO
	C14	QCSB1HJ-390	C CAP
	C15	PU57672-500	TR CAP, LP CH-2 FO
	C16	QCVB1CN-103	C CAP
	C17	QER60JM-476	E CAP
	C18	QCF31HP-223	C CAP
	C19	–	–
	C20	QCBB1HJ-681	C CAP
	C21	QCVB1CN-103	C CAP
	C22	QCVB1CN-103	C CAP
	C23	QEK61HM-104	E CAP
	C24	QCVB1CN-103	C CAP
	C25	QCBB1HJ-820	C CAP

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	C26	QCF31HP-223	C CAP
	C27	QET60JM-476	E CAP
	C28	–	–
	C29	QCVB1CN-103	C CAP
	C30	–	–
	C31	QCSB1HJ-330	C CAP
	C32	QCVB1CN-103	C CAP
	C33	QCF31HP-223	C CAP
	C34	QET60JM-476	E CAP
	L1	PU54223-101KG	PEAKING COIL
	L2	–	–
	L3	–	–
	L4	PU54223-560JG	PEAKING COIL
	L5	PU54223-101KG	PEAKING COIL
	L6	PU54223-101KG	PEAKING COIL
	CN1	PU58844-12	CAP. HOUSING
	CN2	PU56258-10	CAP. HOUSING
	CN3	PU58844-2	CAP. HOUSING
	TP	PU57545	TEST PIN, TP1–6
	SLD1	PU59080	PRE SHIELD (1)
	SLD2	PU59081-1-3	PRE SHIELD (2)
	BKT1	PQ42558	BOARD BRACKET
	LUG1	PQ40433-2	EARTH LUG
	SCR1	DPSP2606Z	ASS'Y SCREW
	SCR2	DPSP2606Z	ASS'Y SCREW, x 2

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# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22329B1	DECK TERMINAL BOARD ASS'Y [51]
	R1	QRD181J-151	CR
	R2	–	–
	R3	QRD181J-331	CR
	PS1	GP3A21	PHOTO INTERRUPTER
	CN1	PU58798-17	CAP. HOUSING, 3–19

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# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22329A2	RELAY BOARD ASS'Y [52]

* *

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22329A3	REC SAFETY BOARD ASS'Y [53]
	S1	PU58644-1-3	REC SAFETY SWITCH

* *

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22329A4	END SENSOR BOARD ASS'Y [54]
	HD1	PQ31047	E.S. HOLDER
	Q1	PN268R-NC	PHOTO TRANSISTOR
	CN1	PU49215-102	CAP. HOUSING

* *

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
			CASSETTE HOUSING BOARD [56]
		PU36044-1-2	CASSETTE HOUSING BOARD
	PS1	PU58879	PHOTO INTERRUPTER
	Q1	PN268R-NC	PHOTO TRANSISTOR
	R1	QRD161J-471	CR
	CN1	PU58844-106	CAP. HOUSING

* *

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22344A-1	DRUM MDA BOARD ASS'Y [57]
	IC1	UPC339G2	FLAT IC
	IC2	UPC324G2	FLAT IC
	IC3	UPD4013BG	FLAT IC
	OR	BU4013BF	FLAT IC
	Q1	2SD601Q,R	CHIP TRANSISTOR
	OR	2SC2412KT-96Q,R	CHIP TRANSISTOR
	Q2	2SD601Q,R	CHIP TRANSISTOR
	OR	2SC2412KT-96Q,R	CHIP TRANSISTOR
	Q3	2SD601Q,R	CHIP TRANSISTOR
	OR	2SC2412KT-96Q,R	CHIP TRANSISTOR
	Q4	2SD1292T103Q,R	TRANSISTOR
	D1	MA151WK	CHIP DIODE
	OR	DAN202K	CHIP DIODE
	D2	MA151WK	CHIP DIODE
	OR	DAN202KT	CHIP DIODE
	D3	MA151WK	CHIP DIODE
	OR	DAN202KT	CHIP DIODE
	D4	MA165	DIODE
	OR	1SS133	DIODE
	D5	RD5.1ES-T1B1	ZENER DIODE
	OR	HZS5.1EB2	ZENER DIODE
	OR	MTZ5.1B	ZENER DIODE
	R1	QRS188J-103YN	CHIP R
	R2	QRS188J-332YN	CHIP R
	R3	QRS188J-332YN	CHIP R
	R4	QRS188J-104YN	CHIP R
	R5	QRS188J-222YN	CHIP R
	R6	QRS188J-184YN	CHIP R
	R7	QRS188J-103YN	CHIP R
	R8	QRS188J-274YN	CHIP R
	R9	QRS188J-474YN	CHIP R
	R10	QRS188J-103YN	CHIP R
	R11	QRS188J-332YN	CHIP R
	R12	QRS188J-103YN	CHIP R
	R13	QRS188J-104YN	CHIP R
	R14	QRS188J-104YN	CHIP R
	R15	QRS188J-332YN	CHIP R
	R16	QRS188J-153YN	CHIP R
	R17	QRS188J-103YN	CHIP R
	R18	QRS188J-391YN	CHIP R
	R19	QRS188J-102YN	CHIP R
	R20	QRS188J-103YN	CHIP R

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R21	QRS188J-103YN	CHIP R
	R22	QRS188J-103YN	CHIP R
	R23	QRS188J-104YN	CHIP R
	R24	QRS188F-102YN	CHIP R
	R25	QRS188F-472YN	CHIP R
	R26	QRS188J-223YN	CHIP R
	R27	QRS188F-103YN	CHIP R
	R28	QRS188J-222YN	CHIP R
	R29	QRD161J-102	CR
	R30	QRS188J-103YN	CHIP R
	R31	QRS188J-103YN	CHIP R
	R32	QRS188J-0R0Y	CHIP R
	R33	QRS188J-105YN	CHIP R
	R34	QRS188J-105YN	CHIP R
	R35	QRS188J-222YN	CHIP R
	C1	QFV71HJ-104	MY CAP
	C2	QFV71HJ-473	MY CAP
	C3	QCY81HK-102	CHIP CAP
	C4	QER61CM-106G	E CAP
	C5	QCBB1HJ-331	C CAP
⚠	CP1	ICP-F15	CIRCUIT PROTECTOR
	CN1	PU58844-5	CAP. HOUSING
	CN2	PU58844-8	CAP. HOUSING
	B1	QRS188J-0R0Y	CHIP R
	B2	QRS188J-0R0Y	CHIP R
	B3	QRS188J-0R0Y	CHIP R
	B4	QRS188J-0R0Y	CHIP R
	B5	QRS188J-0R0Y	CHIP R
	B6	QRS188J-0R0Y	CHIP R
	B7	QRS188J-0R0Y	CHIP R
	B8	QRS188J-0R0Y	CHIP R
	B9	QRS188J-0R0Y	CHIP R
	B10	QRS188J-0R0Y	CHIP R

* * *

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
⚠		PQ10342-014	REMOTE CONTROL BOARD ASS'Y [RM]
	IC1	M50115APW	INTEGRATED CIRCUIT
	X1 (Q1)	2SD636R,S	TRANSISTOR
	OR	2SD637R,S	TRANSISTOR
	X2 (Q2)	2SD636R,S	TRANSISTOR
	OR	2SD637R,S	TRANSISTOR
	X3 (Q3)	2SB822Q,R	TRANSISTOR
	OR	2SA1430A,B	TRANSISTOR
	D1, D2	MA154WA	DIODE
	OR	DAP201	DIODE
	D3, D4	MA154WA	DIODE
	OR	DAP201	DIODE
	D5, D6	MA154WA	DIODE
	OR	DAP201	DIODE
	D7, D8	MA154WA	DIODE
	OR	DAP201	LED
	D9, D10	MA154WA	LED
	OR	DAP201	LED
	D11	MA165	DIODE
	D12	SE303AY	LED
	OR	LN66S	LED
	D13	SE303AY	LED
	OR	LN66S	LED
	R1	QRD181J-104	CR
	R2	QRD181J-474	CR
	R3	QRD181J-222	CR
	R4	QRD181J-471	CR
	R5	QRD181J-470	CR
	R6	QRD181J-1R2	CR
	R7	QRD181J-1R2	CR
	C1	QCF11HP-101	C CAP
	C2	QCF11HP-101	C CAP
	C3	QET40JM-107	E CAP
	CF1	CSB455EB1T	CERAMIC FILTER
	TER1	PQ10342-003	BATTERY TERMINAL(1) (+) SIDE
	TER2	PQ10342-004	BATTERY TERMINAL(2) (–) SIDE

INSTRUCTIONS

Thank you for purchasing the JVC HR-D180EG Video Cassette Recorder. Before use, read this instruction booklet carefully for obtaining the best results from your new unit.

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SPECIFICATIONS

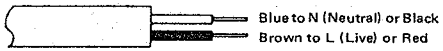
The rating plate and the safety caution are on the rear of the unit.

WARNING – DANGEROUS VOLTAGE INSIDE
WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

IMPORTANT (In the United Kingdom)
Mains Supply (240 V∿, 50 Hz only)

IMPORTANT

Do not make any connection to the Larger Terminal coded E or Green. The wires in the mains lead are coloured in accordance with following code:



If these colours do not correspond with the terminal identifications of your plug, connect as follows:
Blue wire to terminal coded N (Neutral) or coloured Black.
Brown wire to terminal coded L (Live) or coloured Red.
If in doubt – consult a competent electrician.

Note
We recommend that you should disconnect the AC cord from the outlet.

CAUTION

- Disconnect the mains plug from the supply socket when not in use.
- When you are not using the HR-D180EG for a long period of time, it is recommended that you disconnect the power cord from the AC outlet.
- Dangerous voltage inside. Refer internal servicing to qualified service personnel. To prevent electric shock or fire hazard, remove the power cord from the AC outlet prior to connecting or disconnecting any signal lead or aerial.

- Only cassettes marked "VHS" can be used with this video cassette recorder.
- HQ VHS is compatible with existing VHS equipment.

FOR YOUR SAFETY (in Australia)
Install any external aerial to AS 1417.1

Omkopplaren BETRIEB på denna apparat är sekundärt kopplad och skiljer inte apparaten från nätet i läge BETRIEB OFF.

The BETRIEB button does not completely shut off mains power from the unit, but switches operating current on and off.

BEMAERK: I stilling OFF er apparatet stadig forbundet med lysnettet Hvis det ønskes fuldstændig afbrudt skai netledningen trækkes ud.

This unit is produced to comply with Directive 82/499/EEC.

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FEATURES

High-quality pictures

- **HQ (High Quality) System technologies** for superlative VHS pictures with a Detail Enhancer and a higher white clip level.
- **4-Head system** for quality recordings in both SP (Standard Play) and **LP (Long Play)** modes: **LP** allows up to 8 hours of continuous recording with a single cassette.

Tuner features

- **PLL frequency synthesized wide-band cable tuner** with 32-channel storage capacity.
- **Pretuned to European television broadcast frequencies:** VHF, UHF and cable channels including those of **hyper band.**
- **10-Key random-access channel selection** and up/down scan tuning.
- **Compatible with VPS (Video Programme System)** through use of the provided VPS adapter.

Automatic functions

- **Counter go-to function** for direct access to any specified point on the tape.
- **Fully automated playback procedure:** insert a cassette (with safety tab removed), and playback will start automatically.
- **Memory play function** for automatic start of playback after rewind to the beginning of the tape or the counter reading of "0000".
- Automatic backspace editing.
- Auto-power-on convenience.
- Automatic power on/off for cassette ejection.
- Automatic rewind at the end of tape.
- Motorized front-loading cassette system.

Other value features

- **Newly-designed chassis** with super-quiet running and durability for a long life of trouble-free operation.
- **Slim, super-low-profile design** – 95 mm in height.
- **1-Year/8-Event programmable timer with 10-key programming.**
- **Multi-function infrared remote control:** timer programming, direct counter go-to function, 10-key random-access channel selection, and more.
- **60-Minute memory backup** for clock and timer settings.
- Instant recording function with auto shut-off.
- Shuttle Search at 9 times normal speed in SP and LP modes.
- Still and frame advance in SP and LP modes.
- Picture sharpness control.
- Counter search function.
- Comprehensive fluorescent display with symbolic mode indicators.
- Remaining tape time indicator.

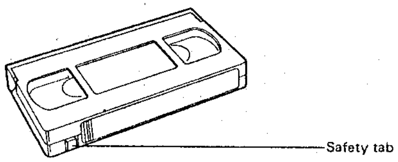
PRECAUTIONS

Handling and storage

- Avoid using the recorder under the following conditions:
  - extremely hot, cold or humid places,
  - dusty places,
  - near appliances generating strong magnetic fields,
  - places subject to vibrations, and
  - poorly ventilated places.
- Be careful of moisture condensation. Avoid using the recorder immediately after moving from a cold place to a warm place or soon after heating a room which was cold. The water vapour in warm air will condense on the still-cold video head drum and tape guides and may cause damage to the tape and the recorder.
- Handle the recorder carefully.
  - Do not block the ventilation openings.
  - Do not place anything heavy on the recorder.
  - Do not place anything which might spill and cause trouble on the top cover of the recorder.
  - Use in horizontal (flat) position only.
- In case of transportation,
  - Avoid violent shocks to the recorder during packing and transportation.
  - Before packing, be sure to remove the cassette from the recorder.

Video cassettes

- This recorder employs VHS-type cassettes only. E-240 for 4 or 8 hours, E-180 for 3 or 6 hours, E-120 for 2 or 4 hours, E-90 for 1 hour and 30 minutes or 3 hours, E-60 for 1 or 2 hours and E-30 for 30 minutes or 1 hour of recording.
- Video cassettes are equipped with a safety tab to prevent accidental erasure. When the tab is removed, recording cannot be performed. If you wish to record on a cassette whose tab has already been removed, use adhesive tape to block the hole.



- Avoid exposing the cassettes to direct sunlight. Keep them away from heaters.
- Avoid extreme humidity, violent vibrations or shocks, strong magnetic fields (near a motor, transformer or magnet) and dusty places.
- Place the cassettes in cassette cases and position vertically.

Moisture condensation

- If you pour a cold liquid into a glass, water vapour in the air will condense on the surface of the glass. This is called moisture condensation.
- Moisture condensation on the head drum, one of the most crucial parts of the video recorder, will cause damage to the tape.
- Moisture in the air will condense on the recorder when you move it from a cold place to a warm place, after heating a cold room or under extremely humid conditions.
- This recorder is equipped with a moisture condensation prevention circuit which automatically heats the head drum according to the ambient temperature. This circuit operates when the unit is plugged into an AC outlet.
- The moisture condensation prevention circuit consumes only a slight amount of power. However, if for some reason you are not using the recorder for a long period of time, it is advisable to remove the power cord from the AC outlet.
- Since the moisture condensation prevention circuit cannot evaporate existing moisture condensation immediately after the power cord has been plugged into the AC outlet, you must allow for a few hours if the recorder is to be used in such areas as would occasion moisture condensation.

Operation

- When a cassette is loaded, the power is switched on automatically.
- The cassette can be unloaded even when the power is off. Pressing the KASSETTE button turns the power on and, after ejection of the cassette, shuts it off automatically in this case.
- As long as the SCHALTUHR button is engaged with the TIMER indicator lit, the BETRIEB and KASSETTE buttons have no effect and unloading of a cassette is not possible. If a cassette has not yet been inserted, simply insert a cassette; the power will be switched on to load the cassette properly and, after completion of automatic loading, the Timer Recording Standby mode will be engaged with power off.

Remote control unit

- Avoid violent shocks, especially take care not to drop the unit.
- Take care not to allow liquid to spill into the unit.
- Do not place heavy objects on the unit.
- Avoid leaving the unit in places subject to direct sunlight or extremely high temperatures.

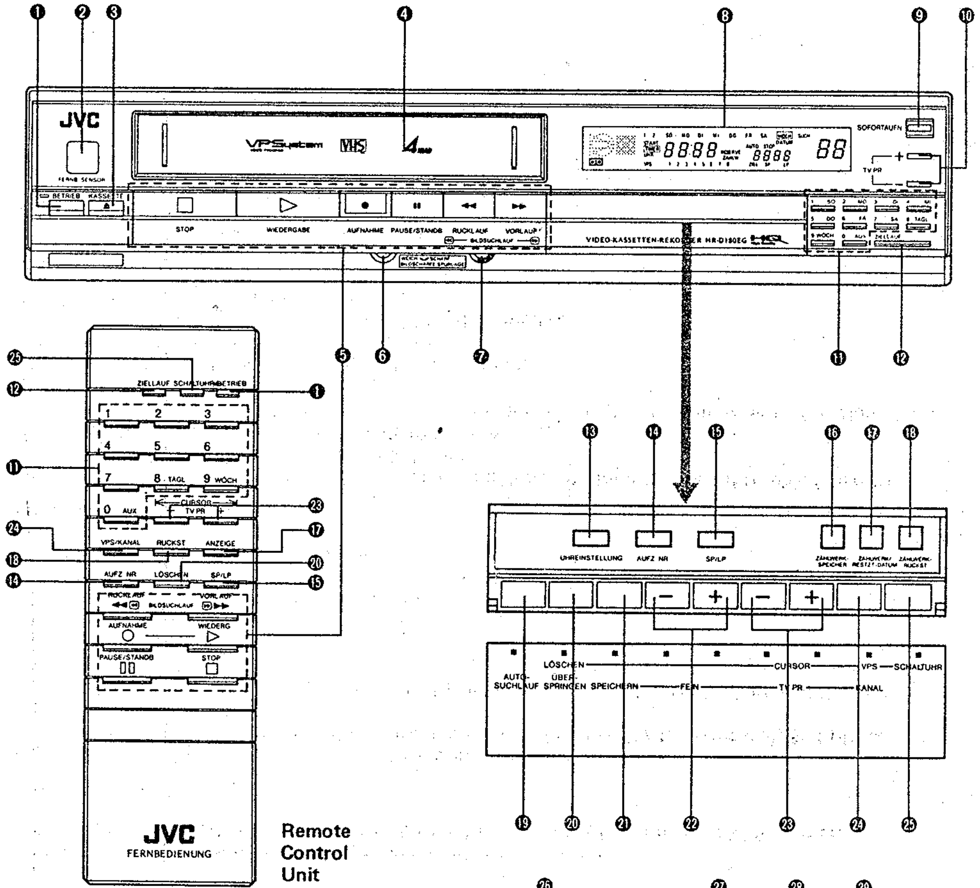
WARNING

1. This recorder can also receive colour television signals in East Germany (DDR) for recording and playback.
2. Recordings made of DDR television signals produce monochrome pictures if played back on another video recorder of PAL or SECAM standard.
3. SECAM prerecorded cassettes or recordings made with a SECAM video recorder produce monochrome pictures when played back with this recorder.
4. This recorder cannot be used in France. Use a SECAM recorder to record French SECAM signals.

CONTROLS, INDICATORS AND CONNECTORS

Keep this page opened so that you can refer to it at any time when you are reading this booklet.

Front Panel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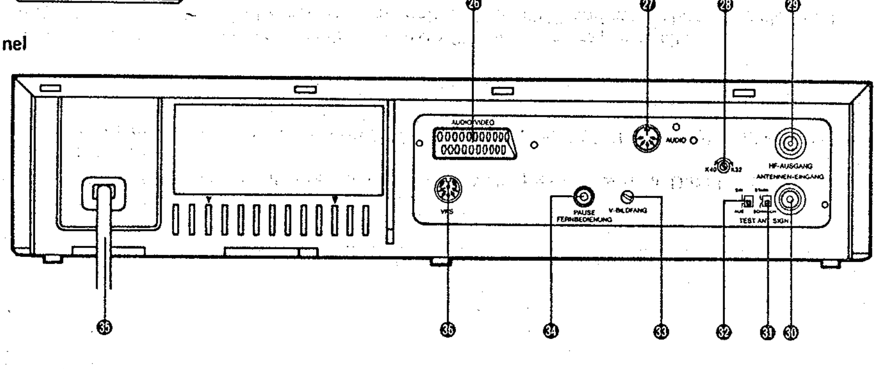
JVC
FERNB SENSOR
BETRIEB
KASSETTE
VPS System
VHS
STOP
WIEDERGABE
AUFNAHME
PAUSE/STANDB
RÜCKLAUF
VORLAUF
BILDSUCHLAUF
SOFORTAUFN
TV PR
VIDEO-KASSETTEN-REKORDER HR-D180EG HQ
UHREINSTELLUNG
AUFZ NR
SP/LP
ZÄHLWERK SPEICHER
ZÄHLWERK RESTZEIT·DATUM
ZÄHLWERK RÜCKST
AUTO-SUCHLAUF
ÜBER-SPRINGEN
LÖSCHEN
SPEICHERN
FEIN
CURSOR
TV PR
VPS
KANAL
SCHALTUHR
ZIELLAUF
SCHALTUHR/BETRIEB
1
2
3
4
5
6
7
8 TAGL
9 WÖCH
0
AUX
CURSOR
TV PR
VPS/KANAL
RÜCKST
ANZEIGE
AUFZ NR
LÖSCHEN
SP/LP
RÜCKLAUF
VORLAUF
BILDSUCHLAUF
AUFNAHME
WIEDERG
PAUSE/STANDB
STOP
JVC
FERNBEDIENUNG

Remote Control Unit

Rear Panel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36
AUDIO/VIDEO
AUDIO
K40
K32
HF-AUSGANG
ANTENNEN-EINGANG
VPS
PAUSE FERNBEDIENUNG
V-BILDFANG
TEST AN
SIGN

Front Panel

① Power button with LED indicator (BETRIEB)
Press to apply power to the HR-D180EG for recording or playback. The indicator will light. Loading a cassette also turns the power on.

② Infrared beam receiving window (FERNB. SENSOR)

③ Cassette eject button (KASSETTE)

④ Cassette loading slot
Insert a VHS video cassette. The door will close and the indicator showing that a cassette is inside will appear on the FDP (fluorescent display panel).

⑤ Tape control buttons

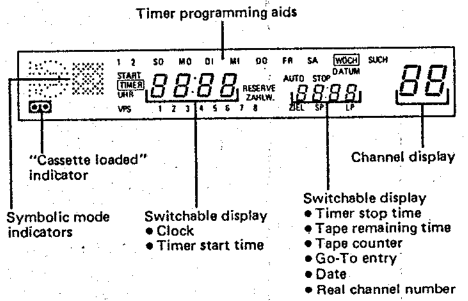
- **STOP button**
  To stop the tape.
- **Play button (WIEDERGABE)**
  Press to play back the tape or cancel the Pause/Still mode. Also press this button together with the AUFNAHME button for recording.
- **Record button (AUFNAHME)**
  Press together with the WIEDERGABE button for video and audio recording.
- **Pause/Still button (PAUSE/STANDB.)**
  Press to stop the tape temporarily to avoid recording of unwanted material or to view a still picture. The still picture can be advanced each time this button is pressed. Keeping this button pressed continuously advances the picture to give a slow-motion effect.
- **Rewind/Shuttle search button (RÜCKLAUF/BILDSUCHLAUF)**
  To rewind the tape, press this button while in the Stop mode. To view the speeded-up picture in the reverse direction for programme search, hold this button pressed while in the Play mode. For the memory play function, refer to page 39.
- **Fast Forward/Shuttle search button (VORLAUF/BILDSUCHLAUF)**
  To fast forward the tape, press this button while in the Stop mode. To view the speeded-up picture in the forward direction for programme search, hold this button pressed while in the Play mode. For the memory play function, refer to page 39.
  The engaged operating mode is indicated by the symbolic mode indicators on the FDP.

PLAY:	▷	FAST FORWARD:	▷▷
STILL:	▯▯	REVERSE SHUTTLE SEARCH:	▷ ◁◁
RECORD:	○	FORWARD SHUTTLE SEARCH:	▷ ▷▷
RECORD PAUSE:	○▯▯	GO-TO PLAY:	✳
REWIND:	◁◁	MEMORY PLAY:	✳

⑥ Picture sharpness control (BILDSCHÄRFE)
Turn this knob clockwise to make the picture sharper. Turn counterclockwise to give the picture a softer tone. Effective only for playback pictures. (No effect for recording.)

⑦ Tracking control (SPURLAGE)
Turn to minimise noise bars, if observed, during playback.

⑧ Comprehensive fluorescent display panel
Fully explained in relevant sections.



⑨ Instant record button (SOFORTAUFN.)
Use this button to start recording instantly and stop automatically after a specific time. (See page 34.)

⑩ Channel +/– buttons (TV PR.)
Press either button to scan to a desired channel.

⑪ Multi-purpose numeric keys

Clock setting:	See page 28.
Channel selection:	See page 29.
Timer programming:	See pages 35 and 36.
Counter Go-To:	See page 38.

The "0" key also functions as the AUX mode select button. To record from a source connected to the rear panel AUDIO/VIDEO socket or AUDIO DIN socket, obtain "0" in the channel display by pressing the "0" key.

⑫ GO TO button (ZIELLAUF)
Press to engage the counter Go-To mode. See page 38.

⑬ Clock adjust button (UHREINSTELLUNG)
To set or adjust the clock time, press this button and use the numeric keys. After time setting, press this button again to start timekeeping.

⑭ Programme button (AUFZ. NR.)
Press this button when you want to preset the timer for unattended recording. See page 35.

⑮ SP/LP recording mode select button
Press to obtain the SP mode when you wish recordings to be made in the SP (Standard Play) mode. When you wish to record longer TV shows or for unattended and prolonged recording of a number of TV shows with a combined time of up to 8 hours (with an E-240 cassette), press this button to obtain the LP (Long Play) mode. The selected mode is indicated by "SP" or "LP" on the FDP.

⑯ Counter memory button (ZÄHLWERK-SPEICHER)
When this button is pressed to engage, the tape will stop automatically at the counter reading of about "0000" in the Rewind or Fast Forward mode.

⑰ Counter/Remain/Date button (ZÄHLWERK/RESTZT./DATUM)
Press to change the display from the Timer Set mode to the Clock mode. Usually use this button to switch the middle 4-digit display to tape counter (ZÄHLW.), remaining tape time (RESERVE) and date (DATUM). The ANZEIGE button on the remote control unit functions in the same way.

⑱ Counter reset button (ZÄHLWERK-RÜCKST.)
Press to reset the tape counter reading to "0000".

⑲ Search button (AUTO SUCHLAUF)
Press this button to initiate automatic scan tuning in the Real-channel mode. (See pages 29 and 30.)

⑳ Cancel/Skip button (LÖSCHEN/ÜBERSPRINGEN)
A dual-purpose switch. Use to clear the programmed data in the Timer Set mode or skip unnecessary channels in the Channel Set mode. The LÖSCHEN button on the remote control unit only functions in the Timer Set mode. (See pages 30 and 36.)

㉑ Store button (SPEICHERN)
Press to store necessary channels. (See page 30.)

㉒ Fine tuning buttons (FEIN –/+)
To fine-tune in to a certain station by shifting the frequency in both directions. (See page 30.)

㉓ Cursor/Channel button (CURSOR/TV PR. –/+)
Press either button to scan to a desired channel. These buttons can also be used as cursor keys for 10-key programming.

㉔ VPS/Real channel button (VPS/KANAL)
Allows for VPS programming when pressed in the Timer Set mode. In all other modes, this button functions to engage the tuner in the Real-channel mode. (See page 30.)

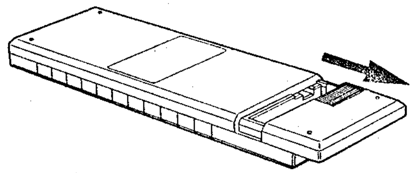
㉕ Timer button (SCHALTUHR)
Press after you have preset the timer for unattended recording.

Infrared Remote Control Unit

The infrared remote control unit gives you full operation control from your viewing position. All control buttons have the same function as the corresponding buttons on the recorder. The maximum operating distance is about 8 m.

Installing the batteries

1. Slide the battery compartment cover on the rear of the unit in the direction of the arrow (▶).



2. Insert 2 "R03"-size batteries (provided) in the correct directions into the battery compartment.
3. Replace the cover.

Rear Panel

㉖ AUDIO/VIDEO socket
A 21-pin standardised audio/video input/output socket for the connection to a TV equipped with the same type of socket. The input from this socket can be recorded in the AUX mode with "0" in the channel display.

㉗ AUDIO input/output DIN socket
Connect a tape recorder or other audio sources or connect the audio output of other video sources for recording. The input from this socket can be recorded in the AUX mode with "0" in the channel display. Also, audio signals being recorded or played back are available from the output terminals of this DIN socket.

㉘ RF converter frequency adjustment screw
See page 27.

㉙ RF output connector (HF-AUSGANG)
Connect to the aerial connector of a TV receiver through the aerial cable (provided).

㉚ Aerial input connector (ANTENNEN-EINGANG)
Connect an aerial to this connector.

㉛ Attenuator switch (ANT. SIGN.)
Set to SCHWACH to receive broadcasts from distant stations. Set to STARK to receive broadcasts of high field strength. Use a screwdriver for setting this switch.

㉜ TEST signal switch
Set to EIN when tuning your TV receiver for the VIDEO CHANNEL. A test signal in the form of two vertical white bars will be available.

㉝ V-lock adjustment screw (V-BILDFANG)
When operating in the Still mode, adjust this screw to eliminate any vertical vibration of the picture. (For any inquiry about this adjustment, contact a JVC dealer.)

㉞ Pause remote control terminal (PAUSE FERNBEDIENUNG)
When using a JVC video camera, connect the remote control cable of the camera adapter to this terminal for the purpose of controlling the starting and stopping of the tape with the camera's start/stop switch.

㉟ Power cord

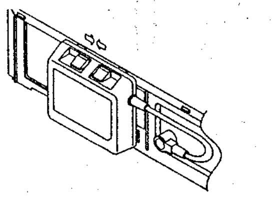
㊱ VPS connector
Connect the provided VPS unit to decode VPS broadcasts. For more details of the VPS system, refer to page 37.

How to attach the VPS unit

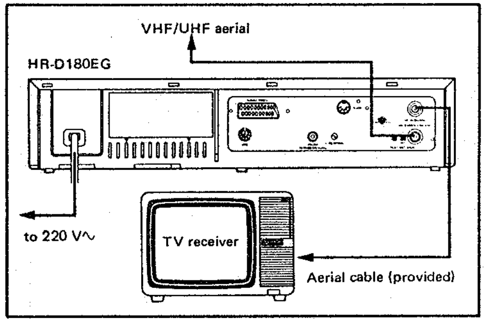
1. Insert the two lower hooks on the unit into the two ventilation holes indicated by the ▼ marks.
2. Insert the two upper latches into the slits near the top of the VCR body.
3. Insert the unit's plug into the VPS terminal on the rear panel.

How to detach the VPS unit

1. Pull out the plug from the VPS terminal.
2. Slide together the two knobs on top of the unit as shown by the arrows.
3. Keeping them pressed together, swing the unit down and lift its hooks out of the ventilation holes.



CONNECTIONS


VHF/UHF aerial
HR-D180EG
to 220 V∿
TV receiver
Aerial cable (provided)

Procedure

- Remove the aerial cable from the TV receiver and reconnect to the HR-D180EG as illustrated. The HR-D180EG is then ready to record off-air programmes.
- Connect the HR-D180EG to the TV receiver using the aerial cable (provided) as illustrated. The TV receiver is then ready to receive TV broadcast programmes as well as accommodate video cassette playback.

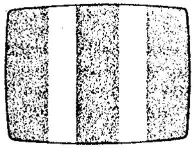
VIDEO CHANNEL SETTING

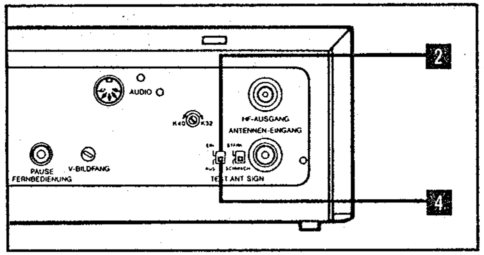
The built-in RF converter permits playback of video and audio recordings through a TV receiver. The signals from the RF converter are viewed through a vacant channel not used for broadcasting in your viewing area.

The converter channel of all units is set to UHF channel 36 prior to shipment. Setting your TV receiver to UHF channel 36 may provide video playback. However, to obtain the best possible reproduction on your TV receiver, accurate adjustment to the RF converter output is required.

Procedure

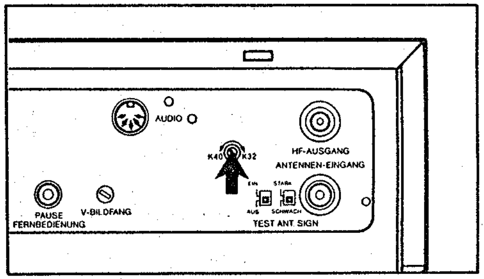
1 Press the front panel BETRIEB button to turn the indicator on. Turn on the TV receiver.
2 Set the TEST switch, located on the rear panel, to EIN.
3 Adjust your TV receiver in the vicinity of UHF channel 36 until you bring in the two white signal bars on the screen as illustrated. This setting is now the VIDEO CHANNEL of the TV receiver to which the HR-D180EG is connected.
4 Reset the TEST switch to AUS.




2
4
AUDIO O
K40 K32
HF-AUSGANG
ANTENNEN-EINGANG
PAUSE
FERNBEDIENUNG
V-BILDFANG
TEST ANT SIGN

Notes:

- When you adjust your TV receiver to channel 36 for video playback, if some interference noise is seen on the screen because of broadcasts on neighbouring channels or if your preset broadcasts should be affected in picture quality, it is necessary to shift the RF converter output frequency from that of channel 36.


AUDIO O
K40 K32
HF-AUSGANG
ANTENNEN-EINGANG
EIN
STARK
AUS
SCHWACH
PAUSE
FERNBEDIENUNG
V-BILDFANG
TEST ANT SIGN

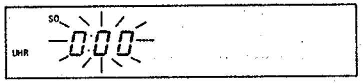
For this purpose, insert a screwdriver into a hole provided on the rear of the set and re-adjust the RF converter frequency adjustment screw in minute steps. Then tune the TV receiver once again until a clear picture is obtained. This adjustment requires extreme precision and must be done with the utmost care. We recommend that you consult your JVC dealer for making this adjustment.

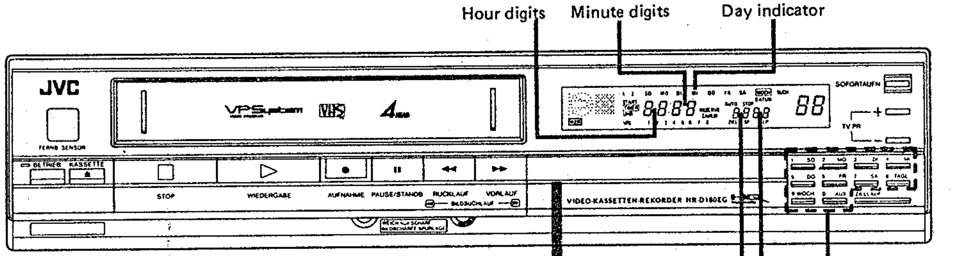
- Be sure to set the TEST switch to AUS after VIDEO CHANNEL tuning has been completed.
- No signal is available from the AUDIO/VIDEO socket while the test signal is being used.
- If a prerecorded VHS cassette is available, TV adjustment for VIDEO CHANNEL setting is also possible using it to obtain a playback picture. Insert the cassette and operate the HR-D180EG for playing back the cassette. Then tune the TV receiver to obtain clear pictures and sound while monitoring the playback picture on the TV screen.
- If your TV receiver is not provided with an AFC circuit, perform fine tuning of the TV receiver when you are actually viewing video cassettes.

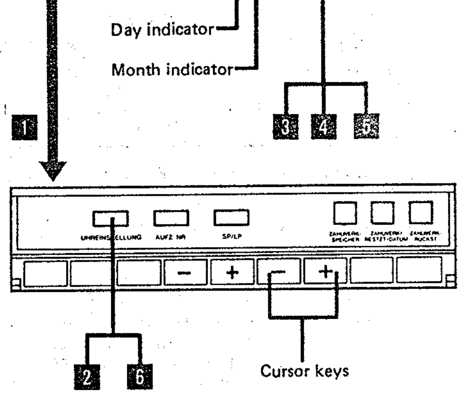
CLOCK SETTING

Plug the HR-D180EG into an AC outlet. The display shows a flashing 0:00 with SO and UHR illuminated. This initial display also functions as a power failure indicator.

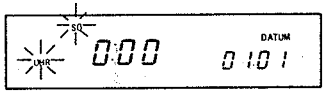
Power failure indicator



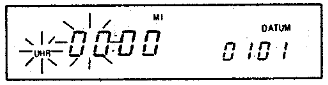



Hour digits
Minute digits
Day indicator
JVC
Day indicator
Month indicator
1
3
4
5
2
6
Cursor keys
STOP
WIEDERGABE
AUFNAHME
PAUSE/STANDB
RÜCKLAUF
VORLAUF
VIDEO-KASSETTEN-REKORDER HR-D180EG
UHREINSTELLUNG
AUFZ NR
SP/LP

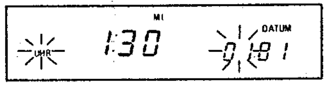
1 Open the sub-control panel door. (Insert your fingertip into the side slot and pull forward.)
2 Press UHREINSTELLUNG.
The display will change to the Clock Set mode with "SO" and "UHR" flashing.


SO
UHR
0:00
DATUM
0 1.0 1

3 Press one of the numeric keys "1 (SO)" to "7 (SA)" that corresponds to the day of setting. The hour digits will start flashing.

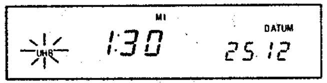

UHR
MI
0:00
DATUM
0 1.0 1

4 Set the hour and minute in that order.


UHR
MI
1:30
DATUM
0 1.0 1

- The flashing position is ready for entry.
- To set a one-digit number, first press "0", then press the numeric key for 1 to 9.
- Zero will not be displayed in the tens place of the hour indication unless the cursor is moved back to the hour digits.
- For a two-digit number, simply press the corresponding numeric keys in the right order.
- In hour setting, numbers larger than 23 will be rejected.
- In minute setting, numbers larger than 59 will be rejected.

5 Set the day and month in that order.
- The flashing position is ready for entry.
- The setting method is the same as for time setting.
- In day setting, invalid numbers such as 32 of January or 30 of February will be rejected.
- In month setting, numbers larger than 12 will be rejected.


UHR
MI
1:30
DATUM
25.12

6 Press UHREINSTELLUNG.
- Press it at the exact instant of the time signal, and the clock will be set accurately to the present time.

Notes:

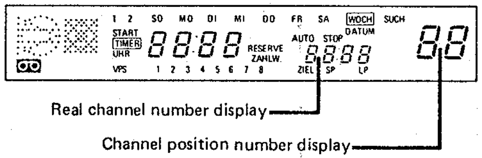
- If you press a wrong numeric key, you can return to the previous position using the CURSOR "–" key.
- Once all necessary data have been entered, you can reach any position for correction using the CURSOR "–" and "+" keys.
- Clock setting is not possible if the SCHALTUHR button is engaged with the TIMER indicator lit. First check to see that the TIMER indicator is off.
- Readjust the date in leap years.

Clock/timer memory backup

- The built-in memory backup battery allows for correct timekeeping for about 60 minutes after the recorder is unplugged from the AC outlet. During this period of power outage, the preprogrammed timer data are also maintained, although the display blacks out.
- When the backup time is expired, the power failure indicator shown above will appear when power is reapplied.

OPERATING THE BUILT-IN TUNER

The HR-D180EG incorporates an advanced frequency synthesizer tuner which is pretuned to 112 channels to cover VHF, UHF and CATV broadcasts. Channel indication is given in two different ways: real channel numbers and channel position numbers. Real channel number indication is available by pressing the VPS/KANAL button, while channel position number indication is always available in the channel display.


1 2 SO MO DI MI DO FR SA WOCH SUCH
START
TIMER
UHR
RESERVE
ZÄHLW.
AUTO STOP DATUM
VPS 1 2 3 4 5 6 7 8 ZIEL SP LP
Real channel number display
Channel position number display

Correspondence between 112 pretuned TV stations and the HR-D180EG's real channel indications

DISPLAY	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
Ch	–	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	A	B	C	D	E	F	G
CC	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19
DISPLAY	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
Ch	H	E21	E22	E23	E24	E25	E26	E27	E28	E29	E30	E31	E32	E33	E34	E35	E36	E37	E38
CC	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30	S31	S32	S33	S34	S35	S36	S37	S38
DISPLAY	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
Ch	E39	E40	E41	E42	E43	E44	E45	E46	E47	E48	E49	E50	E51	E52	E53	E54	E55	E56	E57
CC	S39	S40	S41	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
DISPLAY	58	59	60	61	62	63	64	65	66	67	68	69			75	76	77		
Ch	E58	E59	E60	E61	E62	E63	E64	E65	E66	E67	E68	E69			–	–	–		
CC	–	–	–	–	–	–	–	–	–	–	–	–			X	Y	Z		

Stored channels

A total of 112 channels are receivable. Of them, up to 32 can be stored for easy channel selection. Prior to shipment, some channels are stored.

It is possible to store more channels or skip some channels if there are no broadcasts on those channels in your area. It is possible to change the stored channels to correspond to your preferred channel allocation. Skipped channels can be restored whenever necessary.

- Channel memories are permanent; the programmed channel allocation will not be erased even if the recorder is unplugged from the AC outlet.

Channel selection

To select a channel for recording, normally use the TV PR. -/+ buttons or 10 numeric keys. You can choose any channel from among the stored ones by calling up the corresponding channel position number.

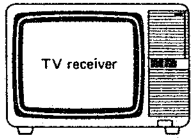
- Use the TV PR. "-" button to scan to a channel in the direction of decreasing numbers; the TV PR. "+" button, in the direction of increasing numbers.
- When using the 10 numeric keys, pay attention to the following: When 1, 2 or 3 is entered, it blinks for about 2 seconds. To set channel 1, 2 or 3, leave it blinking until it remains lit. To key in a two-digit number, enter the 2nd number while 1, 2 or 3 is blinking. The number entered first will be shifted to the tens place and channels 10 to 32 can be set. If you enter an invalid number (larger than 32), the channel display will return to the previous figure after 2 seconds.

If you want to select a channel other than those stored, engage the Real Channel mode and call up a channel, while referring to the real channel number display.

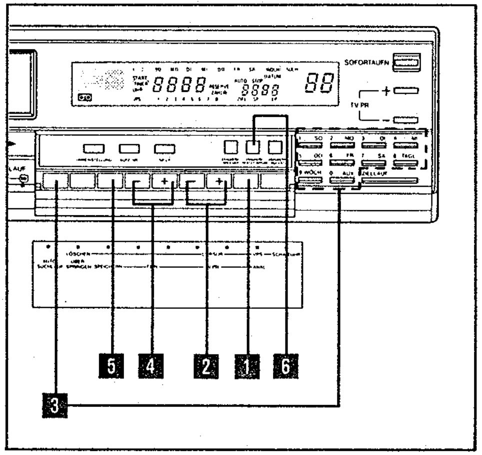
With recorder's controls:
Press the VPS/KANAL button to engage the Real Channel mode and call up a channel by either pressing the AUTO SUCHLAUF button or using the 10 numeric keys.

With remote control:
Press the VPS/KANAL button to engage the Real Channel mode and call up a channel by using the 10 numeric keys.

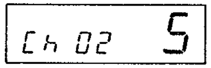
Changing the stored channels



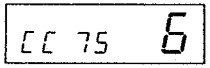
Turn the TV receiver to ON and adjust it to your video channel.



1 Press the VPS/KANAL button.
The middle 4-digit display will change to the Real Channel mode and show the band and real channel number of a station stored for that position.



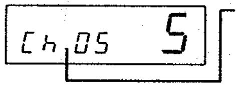
VHF channel 2 is stored for channel position 5.



Cable channel 75 is stored for channel position 6.

2 Call up the channel position number for which you wish to change the stored TV station.
- For this purpose, press either the TV PR. "-" or "+" button. Channel positions from 0 to 32 appear successively. "0" indicates that the unit is in the external input mode usually referred to as AUX.

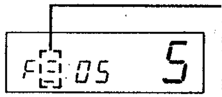
3 Select a TV station which you wish to store into that position.
- Pressing the VPS/KANAL button changes the band and alternates the band indication between "Ch" (for VHF and UHF) and "CC" (for Cable). Select the appropriate indication.
- You can scan to the real channel number corresponding to the desired station by pressing the AUTO SUCHLAUF button. Pressing the AUTO SUCHLAUF button initiates automatic scanning from real channel number Ch 02 to 69, CC 01 to 41, 75, 76, 77, then back to Ch 02. When a broadcast is detected, scanning stops automatically. To advance to the next station, press the AUTO SUCHLAUF button.



"Colon" will appear to indicate that this real channel is not stored for the indicated channel position.

- You can key in that real channel number using 10 numeric keys. 70, 71, 72, 73, 74 and numbers larger than 77 are invalid numbers. If an invalid number is keyed in, the previously selected channel will be received.

4 If the picture quality is unsatisfactory due to ghosts or other noise, perform fine tuning.
- For this purpose, press either the FEIN "-" or "+" button. The Fine Tuning mode will be engaged.



Upper or lower "-" sign indicates the operating tuning frequency is above or below the standard broadcast frequency.
Centre "-" sign will appear when it corresponds to the standard.

Then press either the FEIN "-" or "+" button, depending on the direction of fine adjustment, so that the picture clears up. Each time the button is pressed, the picture condition changes in a single increment. Continuous changing is also possible by keeping the button pressed. If the tuning frequency falls on the next station, the channel number advances as well. If no command is given for 2 seconds after either FEIN button has been pressed, the Fine Tuning mode will be automatically cancelled. To cancel the Fine Tuning mode instantly, press the VPS/KANAL button.
- If the picture is not clear after all procedures, perform fine tuning on your television.
- Distorted pictures or sound will be recorded if fine tuning has not been properly performed. Exercise care with this adjustment since the recorded picture and sound cannot be adjusted later.

5 After confirming both the real channel number and channel position number, press the SPEICHERN button. "Colon" will disappear.
- The selected station will be stored in memory.

6 Press the ZÄHLWERK/RESTZT./DATUM button to disengage the Real Channel mode.

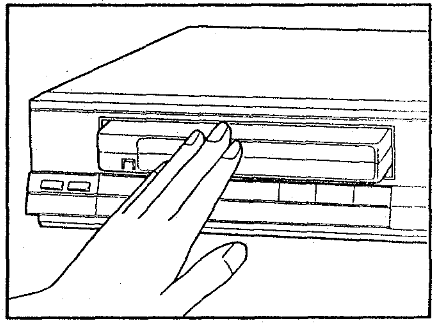
Skipping the stored channels

1. Call up the channel position number that you wish to skip by using the TV PR. button or 10 numeric keys.
2. Press the VPS/KANAL button.
3. Press the ÜBERSPRINGEN button.
   "Colon" will appear to indicate that the displayed real channel is not stored.
4. Press the ZÄHLWERK/RESTZT./DATUM button to disengage the Real Channel mode.
   - The skipped channel number will not appear on the channel display during up/down scan tuning.

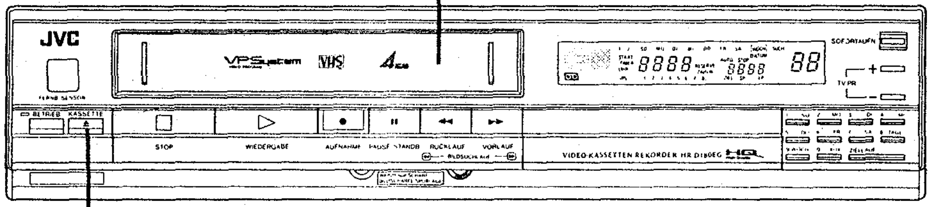
Restoring the skipped channels

1. Press the VPS/KANAL button to engage the Real Channel mode.
   - In this mode, all channel position numbers 1 through 32 are available in the channel display.
2. Select the channel position number that you wish to restore by using the TV PR. "-" or "+" button.
3. Select a real channel that you wish to restore in that channel position by using the AUTO SUCHLAUF button or 10 numeric keys.
4. After confirming both the real channel number and channel position number, press the SPEICHERN button.
5. Press the ZÄHLWERK/RESTZT./DATUM button to disengage the Real Channel mode.

LOADING AND UNLOADING A CASSETTE



Loading
Insert a cassette as illustrated with its labelled side facing you.
- With a cassette inserted, the ▭ mark to indicate "cassette inserted" appears on the display panel.



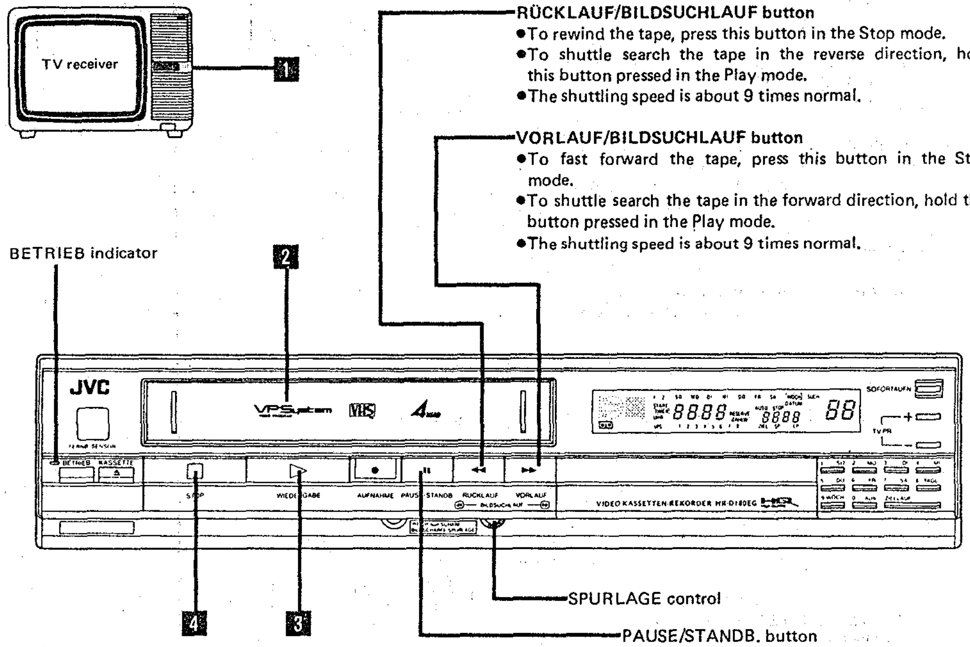
Unloading
Press the KASSETTE button.
The cassette will be ejected.

Auto power-on and auto-play functions
- The cassette can be loaded even when the power has not been turned on. Inserting a cassette into the loading slot turns the power on automatically.
- Inserting a cassette, with its safety tab removed, turns the recorder on and playback of the cassette begins automatically.
- The cassette can be unloaded even when the power has been turned off. If a cassette is inside, pressing the KASSETTE button turns the power on automatically and, after ejection of the cassette, shuts it off automatically.

Notes:
- Be sure to insert the cassette firmly into the slot; otherwise, it will be automatically ejected.
- The automatic loading mechanism will operate only when the cassette is inserted correctly.
- A cassette inverted cannot be inserted.

Caution
- If unloading of a cassette is not possible, check to see whether the TIMER indicator is lit. If so, press the SCHALTUHR button so the TIMER indicator extinguishes.
- Do not attempt to pull out the cassette once automatic loading has started.
- Do not insert fingers or any foreign object beyond the door flaps of the cassette loading slot, as this could lead to injury or damage to the mechanism. Show special caution with children.

PLAYING BACK A VIDEO CASSETTE



RÜCKLAUF/BILDSUCHLAUF button
- To rewind the tape, press this button in the Stop mode.
- To shuttle search the tape in the reverse direction, hold this button pressed in the Play mode.
- The shuttling speed is about 9 times normal.

VORLAUF/BILDSUCHLAUF button
- To fast forward the tape, press this button in the Stop mode.
- To shuttle search the tape in the forward direction, hold this button pressed in the Play mode.
- The shuttling speed is about 9 times normal.

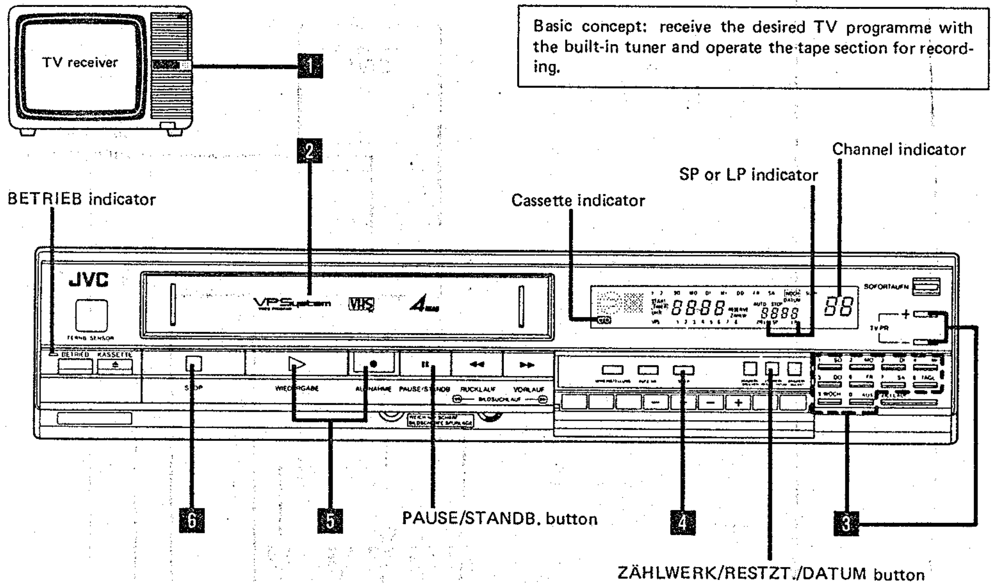
1 Switch ON.
Adjust the TV receiver's channel to the video channel.
2 Load a pre-recorded cassette. Power will be switched on automatically. When the cassette loaded has no safety tab, playback starts automatically.
3 Press WIEDERGABE.
4 Press STOP at the end of the programme.

Memory play function
- If you want to watch the same tape again from the beginning, press the WIEDERGABE button within 2 seconds after you have pressed the RÜCKLAUF button. Playback will start automatically after the tape has been rewound to the beginning. In this case, while the tape is being rewound, the symbolic mode indicator for the Play mode will be blinking.
- When used in conjunction with the counter memory function, this memory play is also available at the counter reading of "0000" after either rewind or fast forward. (For more details of the counter memory function, refer to page 39.)

Notes:
- The SP/LP button may be in either position. The SP or LP mode recording is automatically detected and played back at a correct speed respectively with the corresponding indicator lit on the FDP.
- The tape-end auto rewind mechanism functions in both the Play and Fast forward modes.
- Noise bars may appear on the screen if you play back a tape which was recorded using another recorder. In such cases, adjust the SPURLAGE control. Turn it in either direction to adjust the picture. After playing a particular tape, return the control knob to the centre position.
- When the PAUSE/STANDB. button is pressed during playback, a still picture will appear. The still picture can be advanced in a frame-by-frame manner each time this button is pressed. Keeping this button pressed continuously advances the picture to give a slow-motion effect.
- When the Still mode continues for longer than about 5 minutes, the Stop mode will be entered automatically.
- With some televisions, the still picture may be unstable. This is not due to any defect of the unit.

RECORDING TV PROGRAMMES

Basic concept: receive the desired TV programme with the built-in tuner and operate the tape section for recording.



1 Switch ON.
- •Adjust the TV receiver to your video channel.

2 Load a cassette. Power will be switched on automatically.

3 Select the channel you wish to record.

4 Select the recording speed (SP or LP).
SP: 4 hours with an E-240 cassette.
LP: 8 hours with an E-240 cassette.

5 Press AUFNAHME and WIEDERGABE simultaneously to start recording.

6 Press STOP at the end of the programme.

Notes:
- If there is part of the programme you don't want to record, press the PAUSE/STANDB. button. To release the Pause mode, press the WIEDERGABE button.
- When recording is restarted from the Pause mode, assemble recording is performed so that the playback picture will not distort at the edit point. A few frames recorded before the pause are erased due to overlap of the new recording. This is not due to any defect of the unit.
- When the Pause mode continues for longer than about 5 minutes, the Stop mode will be entered automatically.
- If the AUFNAHME button cannot be engaged, check to see if the cassette safety tab has been removed. (See page 23.)
- When the end of the tape is reached during recording, the tape is automatically rewound to the beginning and stops.
- Press the ZÄHLWERK/RESTZT./DATUM button to use the tape counter. (For more details refer to page 39.)
- Press the ZÄHLWERK/RESTZT./DATUM button once again to check how much recording time is left.
- The built-in tuner's automatic channel lock mechanism prevents the selected channel from being altered during recording. Therefore, if you wish to change the channel during recording, first engage the Pause mode and then select a different channel.

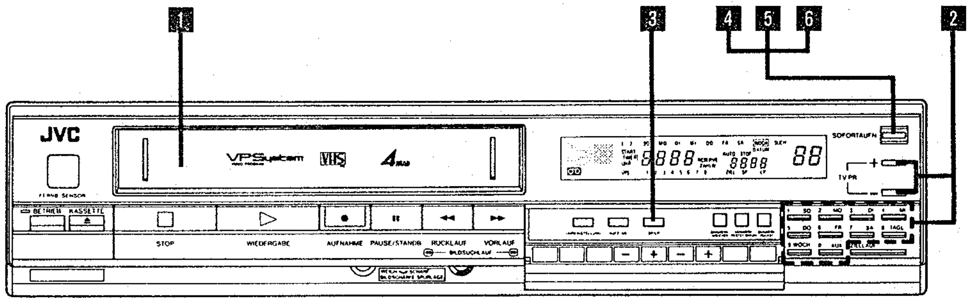
RECORDING ONE PROGRAMME WHILE WATCHING ANOTHER

A programme not being viewed can be recorded while you enjoy viewing another programme.
This permits the recorded programme to be played back later at your convenience.

The key points to be remembered are:
- Select the channel you wish to record with the recorder's channel select buttons.
- Select the channel you wish to view with the TV receiver's channel selector.

INSTANT RECORDING

Besides starting and stopping a recording as usual, the HR-D180EG offers a more convenient possibility: starting by the push of a single button, and recording will stop automatically after a certain period of time. Use this facility for starting a recording before you go to bed or leave home.

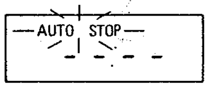


1 Load a cassette.

2 Select the channel you want to record.

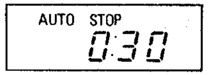
3 Select the recording speed.

4 Press SOFORTAUFN.
- •The following indication will appear on the display, to show that the recorder is ready to start recording.
- •The AUTO STOP indicator on the display will flash.



5 Press SOFORTAUFN. once again.
- •Recording will begin immediately and the following indication will appear on the display, showing that recording will automatically stop and power will switch off after 30 minutes.

•The AUTO STOP indicator remains lit.



6 Each time the SOFORTAUFN. button is pressed, recording time increases by 30 minutes up to 4 hours.
- •For a more precise time setting, use the numeric keys after recording has started. To change both hour and minute digits, simply key in the corresponding numbers. For this purpose, after "0:30" has appeared, specify the time using the numeric keys and press the SOFORTAUFN. button immediately. (Always key in a full number including hours and minutes. For "0:35", key in zero first.)

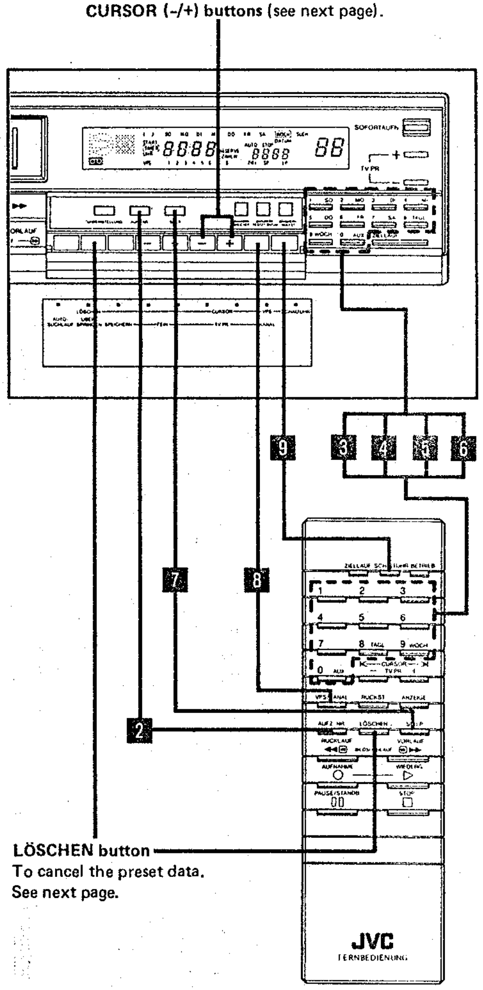
Notes:
- If the SOFORTAUFN. button is not pressed a second time within about 10 seconds after it has been pressed once, the Instant Record mode will be cancelled and the display will change back to the previous display mode.
- If you want to change the time setting again after the SOFORTAUFN. button has been pressed for memorisation of new data, simply press SOFORTAUFN. and redo the programming.
- While recording is in progress, the displayed time counts down; when 0:00 is reached, the Record mode is released after 10 seconds and the power is switched off.
- If you want to stop recording after having started recording in the Instant Record mode, press the STOP button.
- The instant recording function can also be used as a sleep timer. If you press the SOFORTAUFN. button during normal recording, the AUTO STOP indicator will light on the display and the indication "0:30" will be obtained, showing that recording will stop automatically after 30 minutes. The time span can be adjusted in the same way as for instant recording up to 9 hours, 59 minutes.
- Instant recording has priority over all other modes including VPS recording. If a preset VPS programme starts during instant recording, recording of that VPS programme will begin only after the Instant Record mode has ended.
- If the SOFORTAUFN. button is pressed with a non-recordable cassette loaded (one with its safety tab removed), the cassette will be automatically ejected.
- If you want to perform instant recording after you have set the timer and engaged the SCHALTUHR button, press the SOFORTAUFN. button as usual. Power will be turned on and instant recording will start. After instant recording has been performed, the Timer mode is automatically re-entered and power is turned off. The preset time for instant recording has priority over the timer preset time.
- If the preset START time for a timer recording should come after the STOP time of the instant recording, this timer recording will still be made automatically.
- If you want to check the remaining tape time or Counter reading while performing instant recording, press the ZÄHLWERK/RESTZT./DATUM button to obtain the desired indication (the AUTO STOP indication disappears). To return to the AUTO STOP indication, press the SOFORTAUFN. button once, or wait for about one minute and the remaining time indication will reappear automatically.

AUTOMATIC VPS OR TIMER RECORDING

The built-in 8-event/1-year calendar timer permits recording of selected channels on preset days from preset start times to preset stop times.

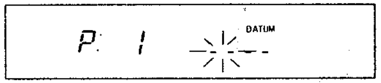
1 **First of all, load a cassette (with safety tab in place); power will be switched on automatically.** Programme the timer using the recorder's controls or remote control unit.

CURSOR (-/+) buttons (see next page).

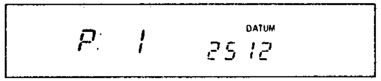


LÖSCHEN button
To cancel the preset data.
See next page.

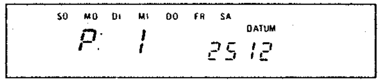
2 Press AUFZ. NR.
The display will change to the Timer Set mode with P: 1 illuminating and the date display section flashing. You are ready to enter the data into No. 1 programme memory. To advance to programme numbers 2 – 8, press again. After programme 8, the Clock mode will be engaged.



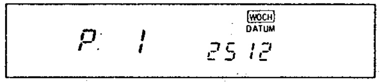
3 Enter the date using numeric keys.



- Invalid numbers will be rejected.
- To record a daily serial starting on the day of setting, move the cursor with the CURSOR "+" button to the START time setting without entering any date figure.
- To record a daily serial starting on a certain day, press 8 (TÄGL.) and enter the date.

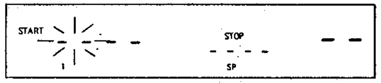


- The "daily" entry can be cancelled by pressing 8 again.
- To record a weekly serial, press 9 (WÖCH.) and enter the date.

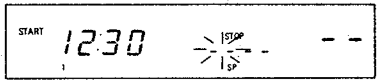


- The "weekly" entry can be cancelled by pressing 9 again.
- Both "daily" and "weekly" information can be entered or cancelled also in the time setting stage.
- When both day and month data have been entered, the display will change to the time setting mode and the programme number will be displayed at the bottom of the FDP panel.

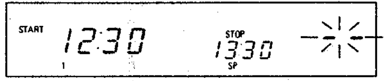
4 Key in the start time.



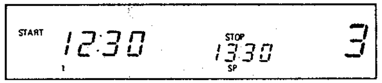
- To key in a one-digit number of hours or minutes, first press 0. Then press the relevant numeric key.
- The minute digits will start flashing after keying in the hour.
- The hour digits of the "STOP" time will start flashing after keying in the start time.



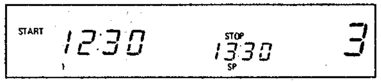
5 Key in the stop time in the same manner as the start time.
- The digits of the channel display will start flashing after keying in the stop time.



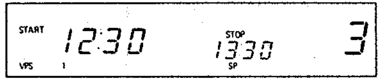
6 Enter the channel. Refer to page 29.



7 Press SP/LP to obtain the desired recording mode indication on the display.
- The SP or LP entry can be made anytime while in the Timer Set mode.



8 For VPS recording (refer to page 37), press the VPS/KANAL button.
- VPS will be displayed.
- The VPS entry can be made or cancelled anytime in the Timer Set mode.



9 Press SCHALTUHR button.
- The TIMER indicator will light.
- The display will return to the Clock mode, also showing the programme numbers for which recording data has been programmed.

How to use the CURSOR keys (−/+ on the remote control)
- If you press a wrong key and the flashing position has advanced, press "-" to return to the previous position for correction.
- Once all data have been programmed, you can reach any position for correction using "-" or "+". The flashing position is ready for re-entry.
- The cursor (flashing position) advances or returns in the following order.

Date ⇄ Start time ⇄ Stop time ⇄ Channel

(Pressing AUFZ. NR. engages the check mode in which no position flashes and data correction is not possible. To correct the data, press either CURSOR key; "+" to move to "Date" or "-" to move to "Channel".

IMPORTANT INFORMATION ON VPS AND TIMER RECORDING

Setting the DATE, START and STOP times
- It is not possible to set the DATE, START and STOP times unless the date and the clock time have previously been set.
- Enter the data while the digit positions are flashing.
- Unless the START time has been properly set, STOP time setting is not possible.
- The STOP time can be set within 24 hours from the START time. If the hour setting for the STOP time runs into the following day, there is no need to set the day. Recording will stop at the preset time on the following day.
- Non-applicable numbers (such as January 32, February 30 for dates, 24 or larger for hours, 60 or larger for minutes and 33 or larger for channels) will be rejected when keyed in.

Last-channel memory
- The currently tuned channel locks in the Timer Set mode and, when the display returns to the Clock mode, the locked channel is displayed.

Cancelling the preset data
- The preset programmes can be cancelled by pressing the LÖSCHEN button. For this purpose, first engage the Timer Set mode for the number you wish to cancel and then press the LÖSCHEN button.
- Unless the VPS mode is engaged, an executed programme is automatically cleared.

Checking the programmed data
- Checking and re-programming can be performed anytime, even when the SCHALTUHR button has already been engaged.
- While recording is actually taking place in the regular Timer mode, the STOP time can be changed. For this purpose, engage the Timer Set mode and move the cursor; only "STOP" time will flash. This means you can re-programme the stop time.
- While recording is actually taking place according to one preset programme, all other preset programmes can be checked or re-programmed.
- To disengage the Timer Set mode, press the ZÄHLWERK/RESTZT./DATUM button (on the recorder) or the ANZEIGE button (on the remote control).

TIMER indicator (Error indication)

- When the SCHALTUHR button is pressed with a cassette loaded and the timer correctly programmed, the TIMER indicator on the display will light with the corresponding programme number(s) also lighting and the power is turned off.
- When you have preset several programmes at a time, confirm that all the preset programme numbers light together with the TIMER indicator when the SCHALTUHR button is pressed. The programme whose number does not light has not been correctly preset. Recheck the programmed data.
- Programming errors include cases where either "START" or "STOP" time has not been preset, or both these preset times are the same. A "no-channel-programmed" situation is not interpreted as an error, and recording will be made of the currently tuned channel.
- If all programmes have been wrongly preset, the TIMER indicator will flash for about 10 seconds when the SCHALTUHR button is pressed, and remain lit with no programme number lit.
- If the SCHALTUHR button is pressed when a cassette is not loaded, the TIMER indicator will continue blinking.
- If a cassette with its safety tab removed has been loaded, it will be ejected automatically when the SCHALTUHR button is pressed. The TIMER indicator will continue blinking. Also, a programmed timer recording will not be executed after the start time has passed, even if you insert a cassette.
- As long as the SCHALTUHR button is engaged, unloading of a cassette is not possible.

VPS operation

- When a VPS code corresponding to the intended TV programme is detected, recording will start with "VPS" blinking. When the VPS code changes to another, recording will stop.
- If no VPS code is detected during the VPS standby mode (for example, the tuned-in station does not transmit VPS codes), ordinary timer recording will be engaged; recording will start at the preset time and stop at the preset time.
- When an interruption code is detected during VPS recording, the recorder enters the VPS standby mode and restarts recording when the regular VPS code is restored.
- When the VPS code stops for some reason during VPS recording, recording will stop at the preset stop time.
- If a system status code which cancels VPS recording is detected during the VPS standby mode, ordinary timer recording will be engaged.
- During VPS recording, the number of the programme that is presently operating and the indication "VPS" will be blinking.
- After VPS recording, the power is switched off and the auto rewind mechanism does not function. If the end of the tape is reached during VPS recording, the cassette is automatically ejected and then the power is switched off.

Regular timer operation

- If the VPS mode is not engaged, tape loading starts 20 seconds before the preset START time and the recording start signal is triggered 2 seconds before the preset time so that recording starts exactly at the preset time.
- During timer recording, the number of the programme that is presently operating will be flashing.
- Operation at the end of recording is the same as with VPS operation.

VPS recording

VPS stands for the Video Programme System which adds flexibility to timer recording with a video cassette recorder. In this system, TV stations transmit special VPS codes using a multiplex system while certain programmes are being broadcast; the codes are different for different programmes. These VPS codes control the starting and stopping of the video recorder and have precedence over times preset in the timer. Using the VPS function, if a programme starts earlier or later than scheduled or overruns its scheduled time, it will be recorded from start to finish. When the VPS unit (provided) is plugged in the rear panel VPS connector, the HR-D180EG detects the VPS codes and controls power on/off and tape start/stop. First programme the timer, then, if you switch on the VPS function, all timer data – date, start time, stop time and channel – are converted to VPS codes and stored in memory. When the VPS function is not engaged, the timer starts and stops recording in the usual way.

If the VPS function is engaged, the HR-D180EG will enter the VPS standby mode at 20:00 on the day previous to the preset day and remain engaged until 3:59 on the following day, if the intended programme has not been broadcast. This means that if the required programme starts within this 32-hour period it will be recorded correctly.

One-year calendar timer

"One-year" presetting capacity means that you can "reserve" a recording on any day, even one year in advance. One extreme case: If the date entry corresponds to the current day and the START time is set to a time before the current time, recording will start on the same day next year.

8-Programme timer

"8-Programme" presetting capacity means that you have 8 separate timers which contain different programming data. Because of this capacity, you can even "reserve" 8 different TV programmes, either on the same day or on different days.

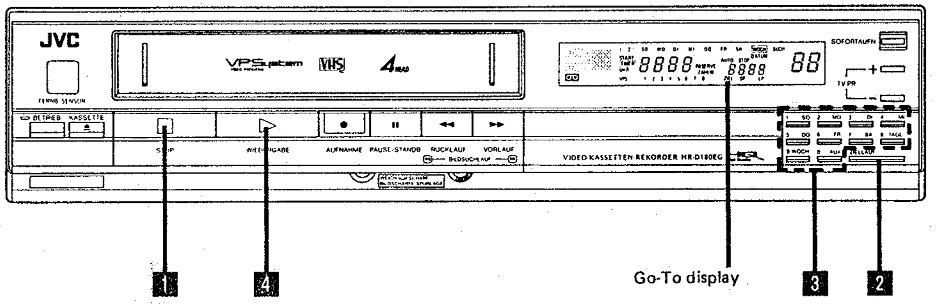
Each programme (No. 1 through No. 8) contains information on "date" (or "daily" or "weekly"), "start time", "stop time", "TV channel number, "SP or LP" and "VPS or regular".

Example of the contents of one programme entry:

Programme number	TV channel number	Date	Start time	Stop time	Recording mode	VPS
2	12	05.12	10:30	11:30	LP	VPS

COUNTER GO-TO FUNCTION

The counter go-to function gives you direct access to any point on the tape by simply specifying a desired counter reading. Depending on your command, the tape will either stop at that point or playback will start automatically from there.



1 Engage the Stop mode.
- If the tape counter mode is not engaged, press the ZÄHLWERK/RESTZT./DATUM button to check the current count.

2 Press the ZIELLAUF button.
- The counter will change to the go-to mode.
There are three possible cases:
(1) Counter reading changes from one number to another.

ZÄHLW. 0520 ▶ ZIEL 1230

Relative count   Absolute count

(2) Counter reading remains unchanged.

ZÄHLW. 1230 ▶ ZIEL 1230

Absolute count   Absolute count

(3) "----" appears instead of a number.

ZÄHLW. 0520 ▶ ZIEL - - - -

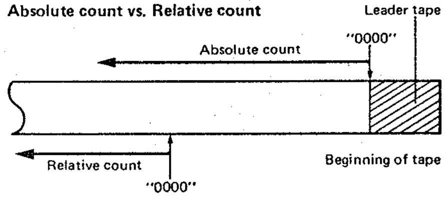
- The recorder did not detect the leader tape when the cassette was loaded and, therefore, cannot determine the tape's present position in relation to its beginning.

3 Specify the point you want to locate by using 10 numeric keys.

ZIEL 1240

4 Press the WIEDERGABE button if you want playback to start there or the STOP button if you want the tape to stop there.
- In cases (1) and (2), the tape will either fast forward or rewind to the specified point.
- In the case of (3), the tape is first rewound to the beginning of the tape (where the counter is automatically reset to "0000") and then is fast forwarded to the specified point.
- Once the beginning of the tape is detected in this way, the tape counter always reads the position in relation to the beginning until the ZÄHLWERK-RÜCKST. button is pressed at a different position.
- If the specified number exceeds the tape length, the tape is first fast forwarded to its end, then rewound to its beginning and stops.
- Use of the go-to function cancels the previous relative count.
- Press the WIEDERGABE or STOP button for cancelling the Go-To function, and the recorder will enter the Play or Stop mode.

Absolute count vs. Relative count



- The absolute "0000" count is automatically set when the leader tape is detected at the time of cassette loading.
- The relative "0000" count is set when the ZÄHLWERK-RÜCKST. button is pressed and does not apply to the counter Go-To procedure.

INSTRUCTIONS:
VIDEO CASSETTE RECORDER

For refernce, the text of the Instruction booklet for this model is reproduced in the following pages.

Numbering of the pages also corresponds with that of the booklet.

The Instructions shown pertain specifically to the Model HR-D180E. For detailed descriptions, be sure to consult the Instruction booklets of the other models.

Main differing points with respect to other models in this series (with suffixes E and EG) are aslo included.

The following table lists the principal differing points among the models (suffixes E, EG and EK) in this series.

Model **Item**		**E**	**EG**	**EK**
Power reguirement		220 V ∿, 50/60 Hz	←	240 V ∿, 50/60 Hz
Channels coverage	VHF channels IV/V	47 – 89 MHz	←	No
	VHF channels IV/V	104 – 470 MHz	←	No
	UHF channels IV/V	470 – 862 MHz	←	21 – 69
Aerial output	UHF channels	32 – 40 (Adjustable)	←	←
AUDIO	AUDIO connector	5-Pin DIN – 20 dB	←	Mic – 67 dB
"	AUDIO/VIDEO socket	21-Pin Peri connector	←	No
Accessories	Video cassette tape	Yes	←	No

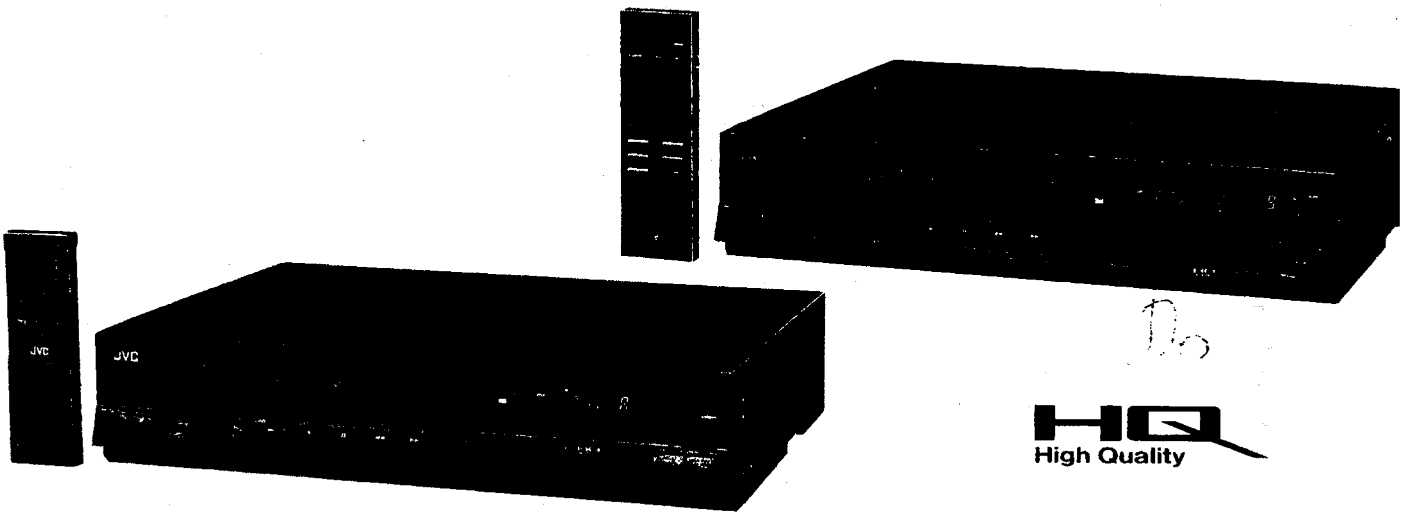
NOTE: ← Same as model at left.

JVC

SERVICE MANUAL

FARB-VIDEO-KASSETTEN-REKORDER VHS

HR-D170EG/HR-D180EG EINSTELLANWEISUN



High Quality

VPS-Adapter (Modell VU-V90E) kann an HR-D170EG/HR-D180EG angeschlossen werden.

TECHNISCHE DATEN

Format	: VHS PAL
Aufnahmesystem	: Rotierendes Zweikopfsystem, Schrägspurabtastung mit im Winkel versetzten Köpfen (HR-D180EG: mit zwei Videokopfpaaren, je 1 Paar für SP und LP-Betrieb)
Videosignalsystem	: PAL-Farb- und CCIR-Monochromsignale, 625 Linien
Bandbreite	: 12,65 mm
Spielzeit	: 240 Min. mit E-240 Videokassette : 480 Min. mit E-240 Videokassette (nur HR-D180EG im LP-Betrieb)
Temperatur	
Betrieb	: 5°C bis 40°C
Lagerung	: -20°C bis 60°C
Frequenzbänder	: VHF 47 – 89 MHz 104 – 300 MHz UHF 470 – 862 MHz
Antennenausgang	: UHF-Kanäle 32 – 40 (einstellbar)
Leistungsaufnahme	
HR-D170EG	: 30 Watt
HR-D180EG	: 33 Watt
Spannungsversorgung	: 220 V∿, 50/60 Hz
Video	
Eingang	: 0,5 bis 2,0 Vss, 75 Ohm, unsymmetrisch
Ausgang	: 1,0 Vss, 75 Ohm, unsymmetrisch
Störspannungsabstand	: 43 dB (Rohde & Schwarz Störspannungsmesser) bei Mittenposition des Bildschärfe-Reglers
Horizontale Auflösung	: 250 Linien bei Mittenposition des Bildschärfe-Reglers
Audio	
Eingang	: AUDIO-Buchse (5 pol. DIN): -20 dBs, me als 50 kOhm, unsymmetrisch AUDIO/VIDEO-Buchse (21 pol. Peri-Buchse): -3,8 dBs (CENELEC-Norm), mel als 10 kOhm, unsymmetrisch
Ausgangspegel	: AUDIO-Buchse (5 pol. DIN): -6 dBs, hoh Impedanz AUDIO/VIDEO-Buchse (21 pol. Peri-Buchse): -3,8 dBs (CENELEC-Norm), hol Impedanz
Ausgangsimpedanz	: Weniger als 1 kOhm, unsymmetrisch
Störspannungsabstand	: Mehr als 40 dB
Frequenzbereich	: 70 bis 10.000 Hz
Schaltuhr	
HR-D170EG	: 14 Tage/4 Programme
HR-D180EG	: 1 Jahr/8 Programme
Abmessungen	: 435(B) x 95(H) x 341(T) mm
Gewicht	: 7,1 kg
Mitgeliefertes Zubehör	: Antennenkabel, Infrarot-Fernbedienung, Batterie x 2, VPS-Adapter (nur HR-D180

Technische Änderungen vorbehalten!

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No. 8451VD/84
August

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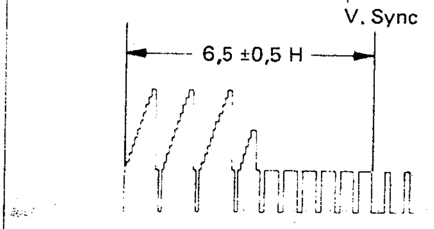
3.2 TIMER-SCHALTUNG (15 TIMER-Platine)

Hinweis: Wenn nicht anders angeben, befinden sich die Testpunkte und Einstellwiderstände auf der TIMER-Platine.

Nr.	Position	Testpunkt	Abgleichpunkt	Signal & Betriebsart	Beschreibung
1	Timer-Uhr	TP2	C102	• E-E	1) An TP2 und GND einen Frequenzzähler anschließen. 2) TP1 (TEST) und GND kurzschließen. Zur Rückstellung von IC1 dann beide Leitungen von Elektrolyt-Kondensator C7 einmal kurzschließen. 3) C102 auf 2048,010 Hz ±1,0 Hz einstellen.

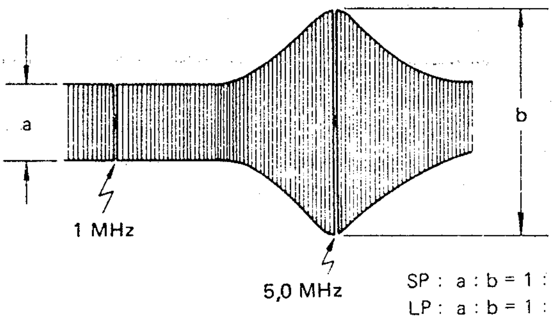
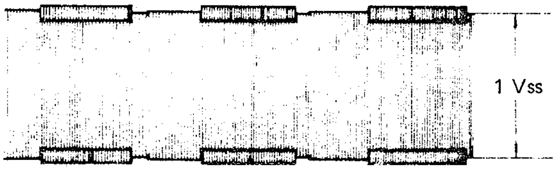
3.3 SERVO-SCHALTUNG (08 SERVO-Platine)

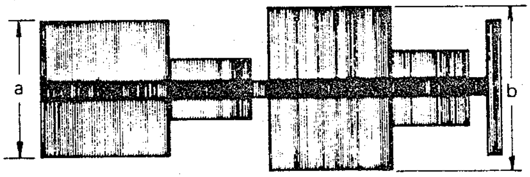
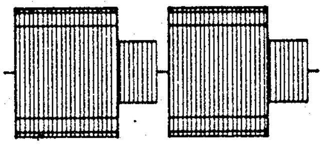
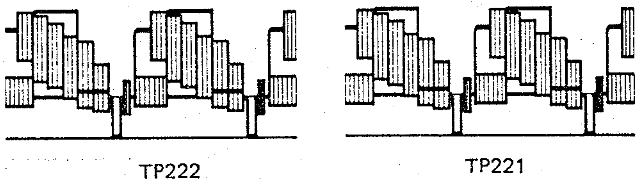
Hinweis: Wenn nicht anders angegeben, befinden sich die Testpunkte und Einstellwiderstände auf der SERVO-Platine.
Vor Schritt 1 und 2 muß die Steuerkopfphase eingestellt werden. Siehe Abschnitt 1.6.3.

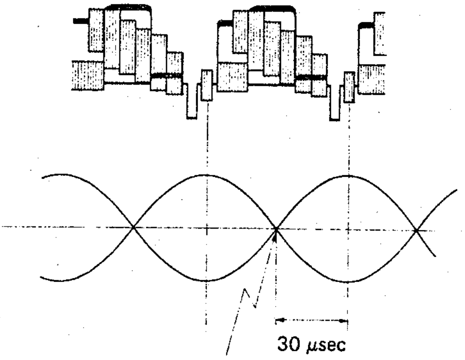
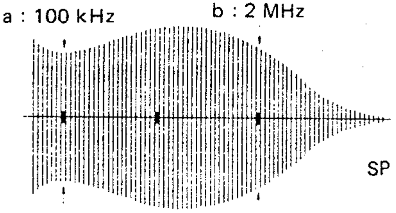
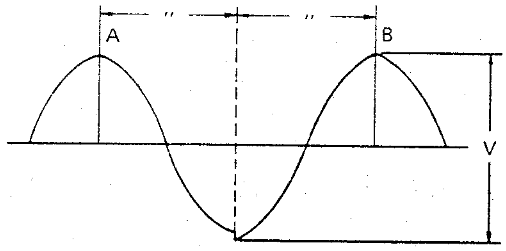
1	Wiedergabe-Umschaltpunkt  Abb. 3-3-1	VIDEO OUT oder Pin 12 von CN2 (03 VIDEO-Platine)	R35 (CH-1) PB SW POINT	• MH-2 Grautreppe • Negative Flanke des Triggersignals • Wiedergabe • SP-Betriebsart	1) An VIDEO OUT oder Pin 12 von CN2 an der VIDEO-Platine ein Oszilloskop anschließen. 2) Abgleichband MH-2 (Grautreppe) abspielen. 3) Das Oszilloskop extern mit der negativen Flanke des Signals von TP11 (DRUM FF) triggern. 4) Mit R35 den Triggerpunkt 6,5 ±0,5 H vor V. Synchronimpuls einstellen.
2	Steuerkopfposition	VIDEO OUT oder Pin 12 von CN2 (03 VIDEO-Platine)	R46 Steuerkopfposition	• Wiedergabe • Farbbalken	1) An VIDEO OUT oder Pin 12 Von CN2 auf der VIDEO-Platine ein Oszilloskop anschließen. 2) Abschnitt Farbbalken von Abgleichcassette MH-2 abspielen. 3) R46 auf maximalen Ausgangspegel einstellen.
3	Vertikalpulsposition	MONITOR	R1 (06 TERMINAL-Platine)	• Farbbalken • Standbild • Aufnahme, dann Wiederg. • SP-Betriebsart	1) Einen Farbbalken aufnehmen und wiedergeben. 2) Auf Standbild schalten, bei Monitorüberwachung R1 auf minimales vertikales Zittern einstellen.

3.4 VIDEO-SCHALTUNG (03 MAIN-Platine)

Hinweis: Wenn nicht anders angegeben, befinden sich die Testpunkte und Einstellwiderstände auf der MAIN-Platine.

Nr.	Position	Testpunkt	Abgleich-punkt	Signal & Betriebsart	Beschreibung
1	Vidoe-kopfresonanz und Güte (43 PRE/REC-Verstärker-Platine)  SP : a : b = 1 : 2 LP : a : b = 1 : 2 **Abb. 3-4-1**	TP2 (CH1 SP REC FM) TP5 (PB FM) TP1 (CH2 SP REC FM) TP3 (CH1 LP REC FM) TP4 (CH1 LP REC FM)	C7 (SP CH1 fo) R2 (SP CH1 Q) C5 (SP CH2 fo) R1 (SP CH2 fo) C13 (LP CH1 fo) R3 (LP CH1 Q) C15 (LP CH2 fo) R4 (LP CH2 Q)	• HF-Wobbel-signal • Wiedergabe • SP-Betriebsart • HF-Wobbel-signal • Wiedergabe • LP-Betriebsart	1) Ohne eingelegte Cassette auf Wiedergabe schalten. (Siehe Mechanische Einstellung 1.1.1). 2) An TP2 (CH1) und TP1 (CH2) einen Wobbelsignalgenerator anschließen. 3) Bei TP5 C7 (CH1) und C5 (CH2) auf maximalen Pegel bei der 5-MHz-Position einstellen und R2 (CH1) sowie R1 (CH2) so einstellen, daß das Verhältnis 1-MHz-Pegel zu 5-MHz-Pegel bei 1:2 liegt,wie in Abb. 3-4-1 gezeigt. 4) Die Einstellung wie für SP CH1 und CH2 vornehmen. Den Wobbelsignalgenerator an TP3 (CH1) sowie R4 (CH2) anschließen. 5) Bei TP5 C13 (CH1) und C15 (CH2) auf maximalen Pegel bei der 5-MHz-Position einstellen und R3 (CH1) sowie R4 (CH2) so einstellen, daß das Verhältnis 1-MHz-Pegel zu 5-MHz-Pegel bei 1:2 liegt, wie in Abb. 2-4-1 gezeigt.
2	VXO	TP306 FSC	R328 VXO	• MH-2 Farbbalken • Wiedergabe • SP-Betriebsart	1) An TP306 einen Frequenzzähler anschließen. 2) Abschnitt Farbbalken von Abgleichcassette MH-2 abspielen. 3) R328 auf 4,433619 MHz ±50 kHz einstellen.
3	Aufnahme-FM-Pegel	TP2 (SP) (CH1 SP REC FM (43 PRE/REC Verstärker-Platine) TP3 (LP) (CH1 LP REC FM (43 PRE/REC Verstärker-Platine)	R119 (REC FM FM ADJ)	• Farbbalken • Aufnahme • LP-Betriebsart • Farbbalken • Aufnahme • SP-Betriebsart	1) Ein Farbbalken-Eingangssignal anlegen. 2) An TP3 der PRE/REC-Verstärker-Platine ein Oszilloskop anschließen. 3) Bei LP-Betriebsart R119 so einstellen, daß der Austastpegel der vertikalen Austastung bei 1 Vss liegt. 4) Bei SP-Betriebsart sicherstellen, daß der Austastpegel der vertikalen Austastung bei 1,3 Vss liegt.  **Abb. 3-4-2** 1 Vss : LP-Betriebsart 1,3 Vss : SP-Betriebsart

Nr.	Position	Testpunkt	Abgleichpunkt	Signal & Betriebsart	Beschreibung
4	SP-Aufnahme-Farbpegel  Abb. 3-4-3	TP304	R322	• Farbbalken • Wiedergabe • Aufnahme, dann Wiedergabe • SP-Betriebsart	1) An TP304 ein Oszilloskop anschließen, dann Abschnitt Farbbalken von Abgleichcassette MH-2 abspielen und den Farbsignalpegel beobachten. 2) Den Spurlageregler (R401) der OPERATE-Platine so einstellen, daß der Farbsignalpegel als Maximum vorliegt. Den höheren Pegel merken. 3) Den Spurlageregler (R401) der OPERATE-Platine auf seine einrastbare Mittenposition einstellen. 4) Das Farbbalkensignal aufnehmen, dann wiedergeben. Vor der Aufnahme R322 so einstellen, daß der Kanal mit dem höheren Pegel bei 95 bis 105 % des vorher gemerkten Pegels liegt, wenn wiedergegeben wird. Sicherstellen, daß hierbei die Abweichung zwischen den Kanälen innerhalb 3 dB liegt.
5	LP-Aufnahme-Farbpegel	TP304	R438	• Farbbalken • Wiedergabe • Aufnahme, dann Wiedergabe • LP-Betriebsart	1) An TP304 ein Oszilloskop anschließen, dann Abschnitt Farbbalken von Abgleichcassette MH-2 abspielen und den Farbsignalpegel beobachten. 2) Den Spurlageregler (R401) der OPERATE-Platine so einstellen, daß der Farbsginalpegel als Maximum vorliegt. Den höheren Pegel merken. 3) Den Spurlageregler (R401) der OPERATE-Platine auf seine einrastbare Mittenposition einstellen. 4) Das Farbbalkensignal aufnehmen, dann wiedergeben. Vor der Aufnahme R438 so einstellen, daß der Kanal mit dem höheren Pegel bei 75 bis 85 % des vorher gemerkten Pegels liegt, wenn wiedergegeben wird. Sicherstellen, daß hierbei die Abweichung zwischen den Kanälen innerhalb 3 dB liegt.
6	Umkehrfarbpegel	TP405 (PB COLOUR 4,43 MHz)  Abb. 3-4-4	R401 (INVERTED COLOUR LEVEL)	• MH-2 Farbbalken • Wiedergabe	1) An TP405 ein Oszilloskop anschließen und den Signalpegel beobachten. 2) TP434, TP435 und GND über Überbrückungskabel miteinander verbinden. Nochmals den Pegel bei TP405 überprüfen. 3) R401 so einstellen, daß für beide Fälle der gleiche Pegel vorliegt, wie in Abb. 3-4-4 gezeigt.
7	Verzögerter Videopegel (0,5 H)  Abb. 3-4-5	TP222 (ORIGINAL VIDEO IN) TP221 (0,5 H DELAYED VIDEO)	R223 (0,5 H DELAYED VIDEO)	• MH-2 Farbbalken • Wiedergabe • LP-Betriebsart	**Hinweis:** Den verzögerten Videopegel nach Einstellung des Umkehrfarbpegels einstellen. 1) Je einen Kanal eines Zweistrahloszilloskops an TP222 und an TP221 anschließen. 2) R223 so einstellen, daß für beide Messungen der gleiche Pegel vorliegt, wie in Abb. 3-4-5 gezeigt.

Nr.	Position	Testpunkt	Abgleich-punkt	Signal & Betriebsart	Beschreibung
8	Fehlerphase der automatischen Phasenregelung  Abb. 3-4-6	TP405 (PB Colour) TP433 (7,8 kHz)	L401 (7,8 kHz TUNING)	• MH-2 Farbbalken	1) Je einen Kanal eines Zweistrahloszilloskops an TP405 und TP433 anschließen und die Signalform beobachten. 2) L401 so einstellen, daß der Nulldurchgang 30 µsec ±3 µsec vom Zentrum des Burstsignals liegt, wie in Abb. 3-4-6 gezeigt.
9	Verzögerter Zeilensprung (0,5 H) DET	TP432 (VCO OUTPUT)	R418 (0,5 DELAYED Jump DET)	• Kein Signal (AUX) • E-E	1) TP431 und TPSWD 5 V mit Überbrückungskabel miteinander verbinden. 2) An TP432 einen Frequenzzähler anschließen. 3) R418 auf 30 ±0,2 kHz einstellen.
10	SP-Wiedergabe-Frequenzgang  Abb. 3-4-7	TP110 (VIDEO OUT)	R110 (RF EQ)	• Wobbelsignal • Aufnahme, dann Wiedergabe • SP-Betriebsart SP : $\frac{b}{a} = 0 \pm 1$ dB LP : $\frac{b}{a} = -4 \pm 1$ dB	1) An TP 110 ein Oszilloskop anschließen. 2) Den Bildschärferegler (R402) der OPERATION-Platine auf seine einrastbare Mittenposition einstellen. 3) Ein Video-Wobbelsignal (mit Sync) aufnehmen und wiedergeben. 4) R110 so einstellen, daß der 2-MHz-Pegel bei 0 ±1 dB (79 – 96 %) in Bezug zu 100 MHz liegt.
11	LP-Wiedergabe-Frequenzgang	TP110 (VIDEO OUT)	R202 (LP RF EQ)	• Wobbelsignal • Aufnahme, dann Wiedergabe • LP-Betriebsart	1) An TP 110 ein Oszilloskop anschließen. 2) Den Bildschärferegler auf seine einrastbare Mittenposition einstellen. 3) Ein Video-Wobbelsignal (mit Sync) aufnehmen und wiedergeben. 4) R202 so einstellen, daß der 2-MHz-Pegel bei 4±1 dB in Bezug zu 100 MHz liegt wie in Abb. 3-4-7 gezeigt.
12	SECAM DET	TP310 (S DET ADJ) Diesen Punkt zentral zwischen Punkt A und B legen. V = mehr als 5,5 Vss bei Aufnahme V = 6,5 ±0,5 Vss bei Wiedergabe	L351 (1/2 fH TUNING) R355 (S DET ADJ)	• SECAM-Farbbalken • E-E • Aufnahme, dann Wiedergabe	1) An TP310 ein Oszilloskop anschließen. 2) L351 so einstellen, daß die Übergangsstufe im Zentrum zwischen A und B liegt, wie in Abb. 3-4-8 gezeigt.  Abb. 3-4-8 3) Aufnehmen, dann wiedergeben. 4) R355 auf 6,5 ±0,5 Vss einstellen.

3.5 AUDIO- & STEUERSCHALTUNG (0 9 AUDIO & CUE-Platine)

Hinweis: Wenn nicht anders angegeben, befinden sich die Testpunkte und Einstellwiderstände an der AUDIO & CUE-Platine.

Nr.	Position	Testpunkt	Abgleichpunkt	Signal & Betriebsart	Beschreibung
1	Vormagnetisierungspegel	TP31 (BIAS LEVEL)	R20 (BIAS LEVEL)	• Aufnahme • SP-Betriebsart	1) Zwischen TP31 und TP32 ein Digital-Voltmeter anschließen. 2) Ohne Signal auf Aufnahme schalten. 3) R20 auf 12,5 V ±0,2 mVrms einstellen.
2	Audio-Wiedergabepegel	AUDIO OUT	R5 (PB LEVEL)	• Aufnahme • SP- oder LP-Betriebsart	1) An AUDIO OUT ein Oszilloskop anschließen. 2) An AUDIO IN ein Audiosignal (-8 dBs/1 kHz) legen und zusammen mit einem Videosignal aufnehmen, dann wiedergeben 3) R5 so einstellen, daß der Wiedergabe-Ausgangspegel des Audiosignals bei -6 ±2 dBs.

3.6 TUNER/ZF-SCHALTUNG (0 7 TU/IF-Platine)

Hinweis: Wenn nicht anders angegeben, befinden sich alle Test- und Einstellpunkte an der TUNER/IF-Platine.

Erforderliche Geräte:

1. Oszilloskop
2. ZF-Wobbelsignalgenerator mit Markengeber (Bild – Ton ZF
3. Gleichspannungsversorgung – Für Betriebsspanung (12,0 V)
   – Für ZF AGC-Vorspannung (ca. 5 V variabel)
4. Anschlußkabel (Wobbelsignal-Kabel) wie unten gezeigt.

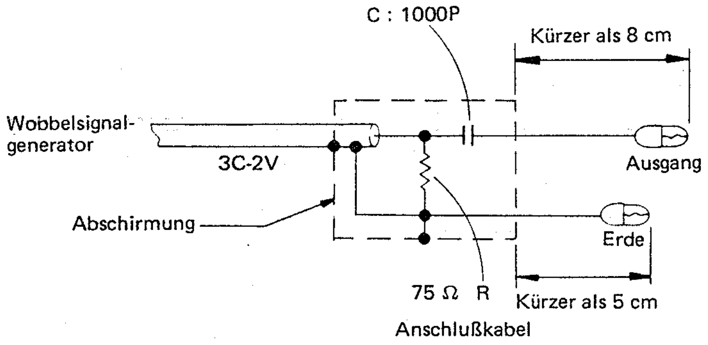
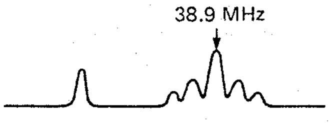
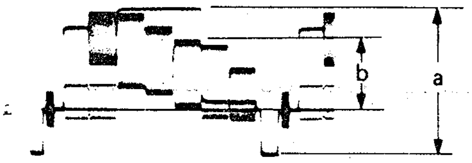
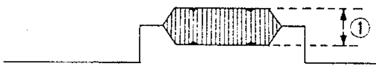
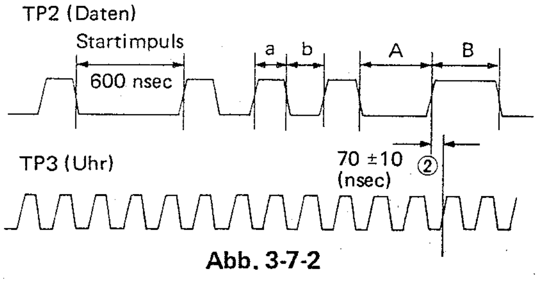


Abb. 3-6-1

1	VCO 38,9 MHz	Pin 28 von IC1  VCO und Wobbelsignal **Abb. 3-6-2**	T2	• Wobbelsignal • Generator	1) Das in der Abb. gezeigte Anschlußkabel (zur ZF-Einstellung) verwenden und ein ZF-Wobbelsignal an den SAW 1-Eingang legen. 2) An Pin 6 von IC1 (IF AGC) 4,5 V Gleichspannung legen. An Pin 28 (VIDEO DET OUT) ein Oszilloskop anschließen und mit T2 die Signalform an die links gezeigte Marke anpassen. **Hinweis:** Der Wobbelsignalgenerator-Ausgangspegel liegt bei 70 dB μ/75 Ω.
2	Eingangs-ZF	UHF/VHF-Tuner	ZF-Spule	• Wobbelsignal • Generator	1) Das Anschlußkabel für die ZF-Einstellung verwenden und ein ZF-Wobbelsignal an den Eingangs-Testpunkt (U/V TUNER) (TP) legen. 2) Mit dem Anschlußkabel für die ZF-Einstellung SAW 1-Eingang mit dem ZF-Meßgerät verbinden. 3) Die Eingangs-ZF-Spule auf Maximalfrequenz einstellen.

Nr.	Position	Testpunkt	Abgleich-punkt	Signal & Betriebsart	Beschreibung
3	Tonfalle	UHF/ VHF-Tuner (Im Tuner-teil)	T1	• Farbbalken	1) An den U/V-Tuner-Testpunkt ein 32,4 MHz-Signal mit 400 Hz Amplitudenmodulation legen. 2) Ein Oszilloskop an Pin 28 von IC1 anschließen und die Spule der Ausgangsseite von T1 auf Minimalpegel einstellen.
4	HF AGC	UHF/ VHF-Tuner (Im Tunerteil)	R11	• Farbbalken	1) Ein Farbbalkensignal anlegen und ein Oszilloskop an den ZF-Eingang anschließen. 2) R11 auf Maximalpegel einstellen. Dann mit R11 den Pegel um 10 dB absenken.
5	VPS Y-Pegel	CN3-Pin 1 (VIDEO OUT)	R16	• Moduliertes Signal	1) Ein Signal mit 87,5 % Modulation anlegen. R16 so einstellen, daß bei Pin 1 (VPS OUT) von CN3 ein maximaler Y-Pegel (inkl. Sync) von 2,0 Vss vorliegt.
6	Farbpegel  b : Magenta a : b = 1 : 0.48 Abb. 3-6-3	CN2-Pin 3 (VIDEO OUT)	R42	• Farbbalken	1) Ein Farbbalkensignal anlegen. Unter Annahme des Y-Pegels als 100 % R42 so einstellen, daß für Pin 3 (VIDEO OUT) von CN2 der Magentapegel bei 48 % liegt.

3. 7 VPS-ADAPTER-SCHALTUNG (A 1 -Platine)

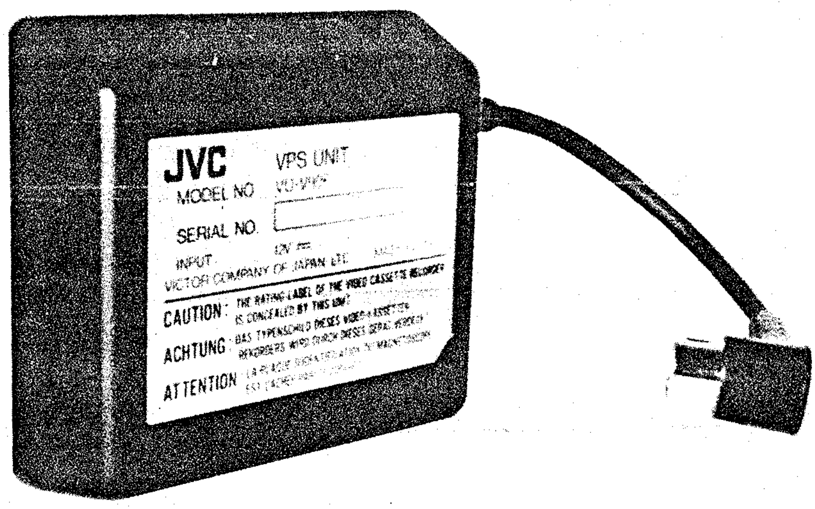
1	Oszillator-Einstellung	TP6	T1	–	1) TP5 and VDD (+5 V) anschließen, TP4 an Erde legen. 2) Die TP6-Signalform im Oszilloskop beobachten. 3) Spule T1 so einstellen, daß das Maximum wie in der Abbildung durch (1) angezeigt vorliegt.  Abb. 3-7-1
2	Funktions-überprüfung	TP2 und TP3		–	1) Unter Bezugnahme auf das Diagramm überprüfen, ob folgende Vorgaben eingehalten. werden: a:b = 200 ±10 (nsec) : 200 ±10 (nsec) A:B = 400±20 (nsec):400±20 (nsec) Der Startimpuls liegt vor dem Datencode und beträgt hier 600 nsec.  TP2 (Daten) Startimpuls 600 nsec a b A B TP3 (Uhr) 70 ±10 (nsec) ② Abb. 3-7-2 2) Zeitsteuerung T1 so einstellen, daß die Zeitdifferenz swischen positiver Daten- und Uhrensignalflanke (als 2 in der Abb. bezeichnet) bei ±10 nsec liegt.

JVC

SERVICE MANUAL

VIDEO PROGRAMING SYSTEM UNIT

VU-V90E


JVC
VPS UNIT
MODEL NO.
SERIAL NO.
INPUT
12V
VICTOR COMPANY OF JAPAN LTD.
CAUTION:
ACHTUNG:
ATTENTION

NOTE: This VPS Unit is separately sold.

No. 8457 (2/2)
June 1986

Anbringen der VPS-Einheit

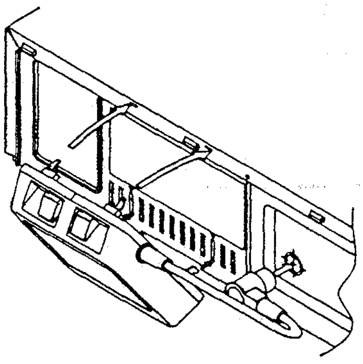
1 : Die beiden unteren Haken der Einheit in die mit den Pfeilmarkierungen gekennzeichneten Ventilationsschlitze einsetzen.
2 : Dann die Einheit wie gezeigt nach oben klappen, und die beiden oberen Riegel in die flachen Öffnungen unterhalb der Rekorderoberseite einführen.
3 : Das Kabel der Einheit an die VPS-Buchse des Rekorders anschließen.

How to attach the VPS unit

1 : Insert the two lower hooks on the unit into the two ventilation holes indicated by ▽ marks.
2 : Inserting the two upper latches into the slits near the top of the VCR body.
3 : Insert the unit's plug into the VPS terminal on rear panel.

Fixation du boîtier VPS

1 : Introduire les deux crochets inférieurs du boîtier dans les deux trous de ventilation indiqués par les reperès ▽.
2 : Faire basculer ver le haut le boîtier en intoduisant les deux verrous supérieurs dans les fentes près du haut du corps du magnétoscope.
3 : Brancher la fiche du boîtier dans la prise VPS du panneau arriere.



Abnehmen der VPS-Einheit

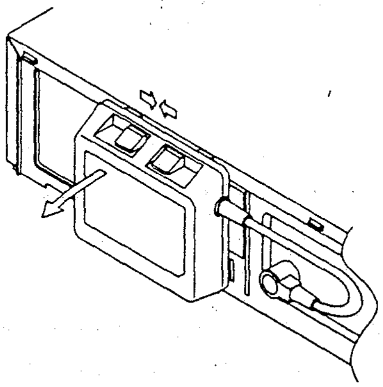
1 : Das Kabel von der VPS-Buchse abziehen.
Die beiden Tasten an der Oberseite der Einheit wie gezeigt in Pfeilrichtung drücken.
3 : Die Tasten so gedrückt halten, und die Einheit nach unten abklappen. Nun die Haken aus den Ventilationsschlitzen ziehen.

How to detach the VPS unit

1 : Pull out the plug from the VPS terminal.
2 : Slide together the two knobs on the top of the unit as shown by the arrows.
3 : Keeping them pressed together, swing the unit down and lift it's hooks out of the ventilation holes.

Démontage du boîtier VPS

1 : Débrancher la fiche de la prise VPS.
2 : Glisser ensemble les deux boutons sur le dessus de l'appareil comme montré par les flèches.
3 : En les maintenant pressés ensemble, basculer le boîtier vers le bas et retirer ses crochets inférieurs des trous de ventilation.



1. ELECTRICAL ADJUSTMENT

1. Oscillator adjustment (TP6 waveform)
   1) Connect TP5 to VDD (+5 V) and TP4 to ground.
   2) Observe the TP6 waveform on an oscilloscope.
   3) Adjust the inner core of coil T1 so that maximum (peak) apperas as shown by (1) in the figure.

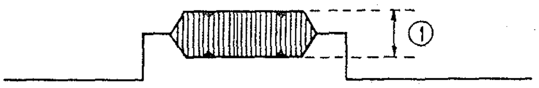


Fig. 1-1

2. Duty check (TP2 and TP3 waveforms)

   Refer to the figure and checkthat
   a : b = 200 ± 10 (nsec) : 200 ± 10 (nsec)
   A : B = 400 ± 20 (nsec) : 400 ± 20 (nsec)

   The start pulse is positioned ahead of the data and is 600 ns only at this point.

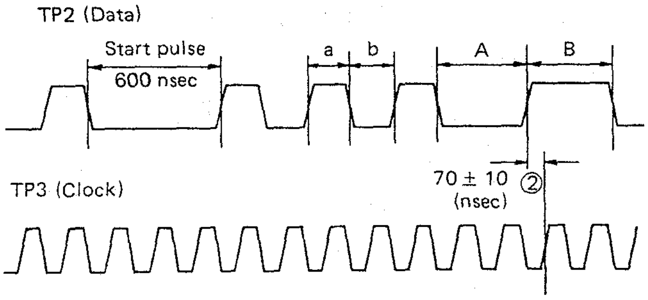


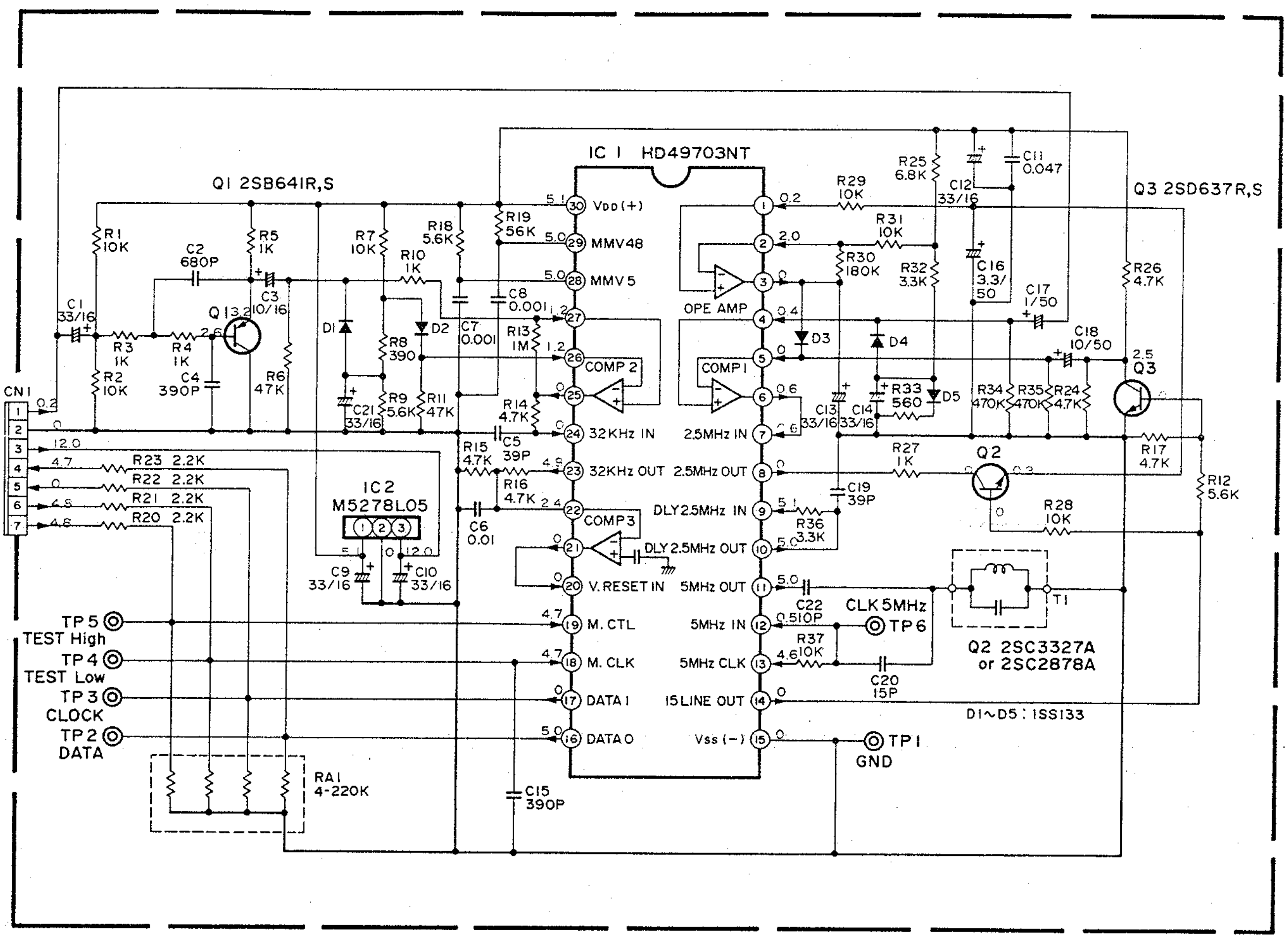
Fig. 1-2

3 Timing

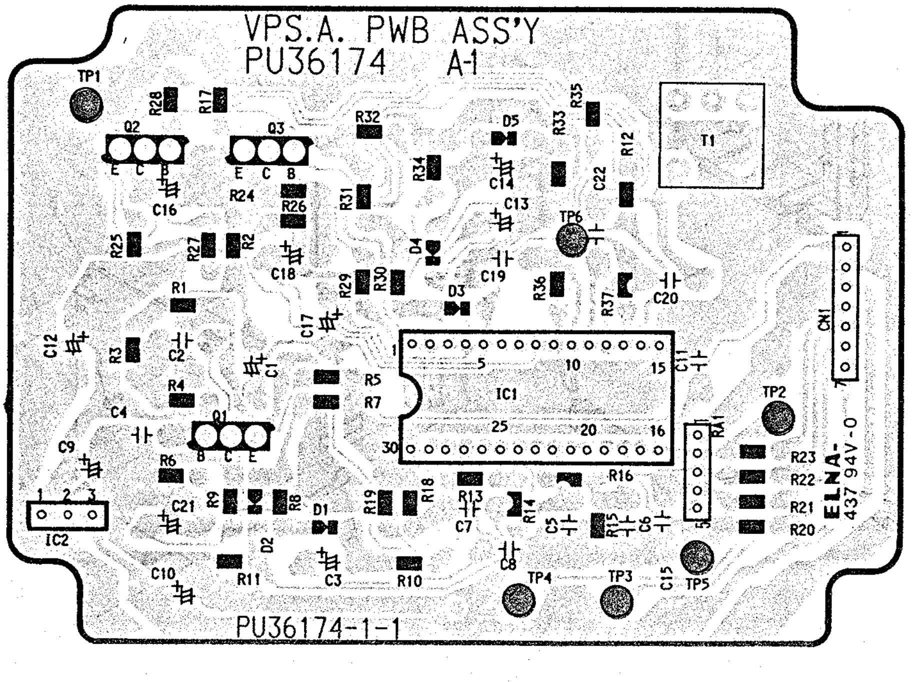
Adjust T1 so that time between data rise and clock rise (2 in figure) is 70 ± 10 ns.

2. SCHEMATIC AND CIRCUIT BOARD

2.1 SCHEMATIC DIAGRAM

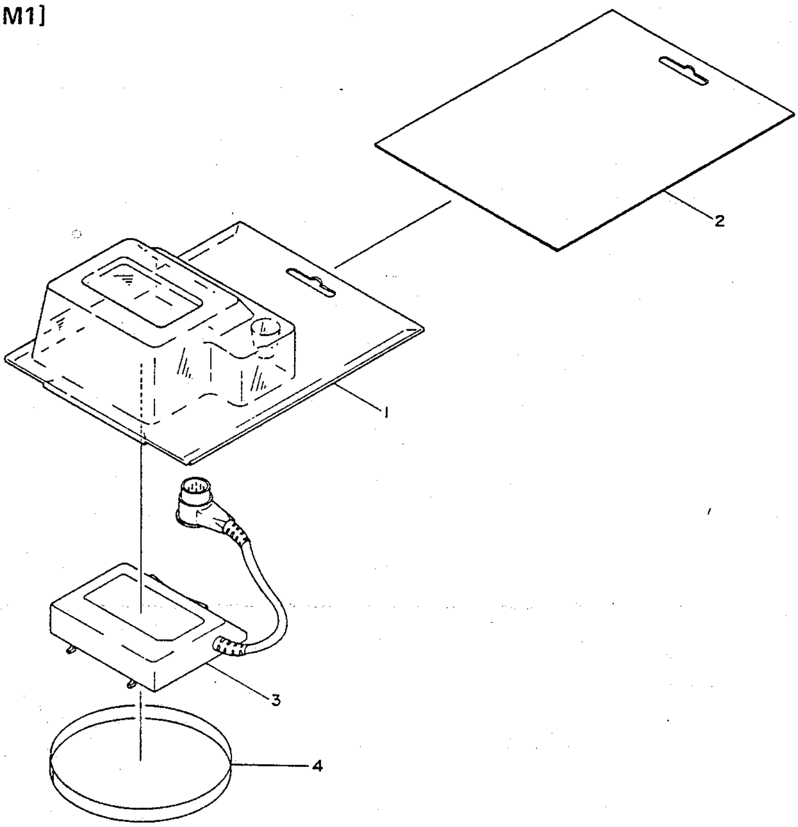

IC 1 HD49703NT
Q1 2SB641R,S
Q3 2SD637R,S
IC2 M5278L05
Q2 2SC3327A or 2SC2878A
D1~D5 : 1SS133
CN1
C. VIDEO 1
GND 2
UNSW 12V 3
DATA 0 4
DATA 1 5
M.CLK 6
M. CTL 7
R23 2.2K
R22 2.2K
R21 2.2K
R20 2.2K
R1 10K
R2 10K
R3 1K
R4 1K
R5 1K
R6 47K
R7 10K
R8 390
R9 5.6K
R10 1K
R11 47K
R12 5.6K
R13 1M
R14 4.7K
R15 4.7K
R16 4.7K
R17 4.7K
R18 5.6K
R19 56K
R24 4.7K
R25 6.8K
R26 4.7K
R27 1K
R28 10K
R29 10K
R30 180K
R31 10K
R32 3.3K
R33 560
R34 470K
R35 470K
R36 3.3K
R37 10K
C1 33/16
C2 680P
C3 10/16
C4 390P
C5 39P
C6 0.01
C7 0.001
C8 0.001
C9 33/16
C10 33/16
C11 0.047
C12 33/16
C13 33/16
C14 33/16
C15 390P
C16 3.3/50
C17 1/50
C18 10/50
C19 39P
C20 15P
C21 33/16
C22 510P
RA1 4-220K
T1
D1 D2 D3 D4 D5
OPE AMP
COMP 1
COMP 2
COMP3
VDD(+) 30
MMV48 29
MMV 5 28
27
COMP 2 26
25
32KHz IN 24
32KHz OUT 23
22
21
V. RESET IN 20
M. CTL 19
M. CLK 18
DATA 1 17
DATA 0 16
1
2
3
4
5
6
2.5MHz IN 7
2.5MHz OUT 8
DLY2.5MHz IN 9
DLY 2.5MHz OUT 10
5MHz OUT 11
5MHz IN 12
5MHz CLK 13
15LINE OUT 14
Vss (−) 15
CLK 5MHz
TP6
TP5 TEST High
TP4 TEST Low
TP3 CLOCK
TP2 DATA
TP1 GND
0.2
12.0
4.7
4.8
4.8
5.1
5.0
5.0
1.2
4.9
2.4
2.6
3.2
0.4
0.6
2.0
2.5
0.3
5.0
4.6
12.0

2.2 CIRCUIT BOARD

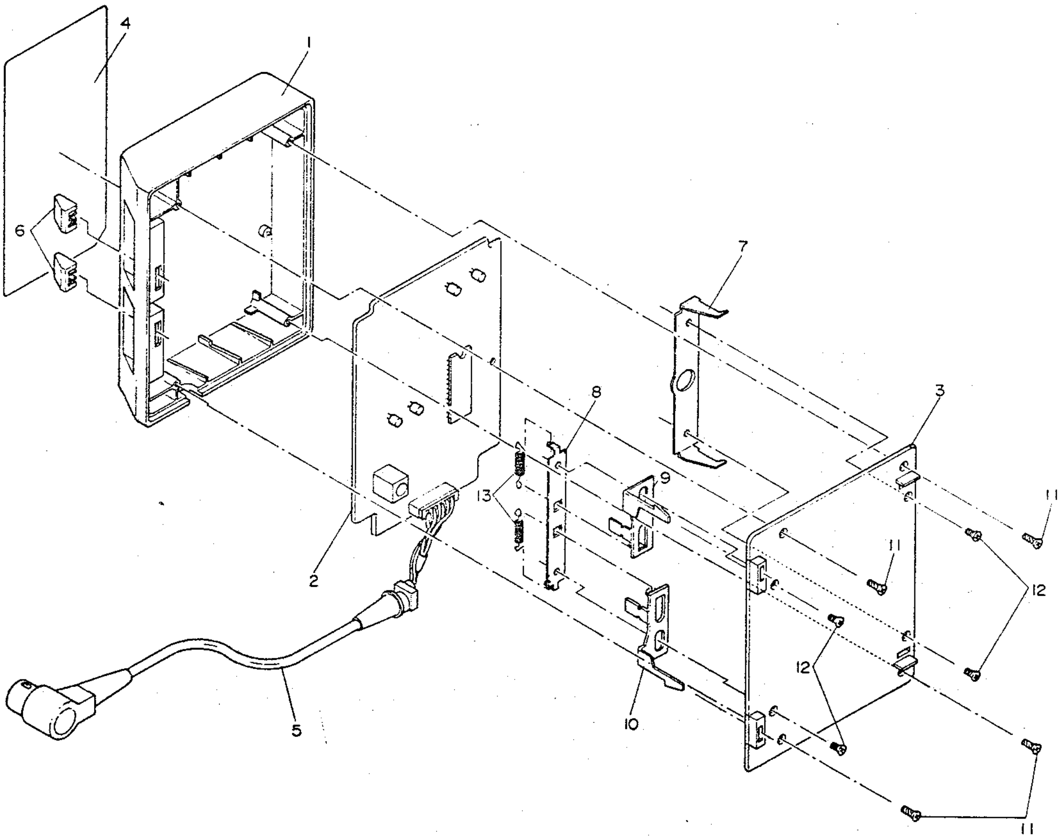

VPS.A. PWB ASS'Y
PU36174 A-1
PU36174-1-1
ELNA-437 94V-0
TP1 TP2 TP3 TP4 TP5 TP6
Q1 Q2 Q3
E C B
IC1 IC2
1 2 3
1 5 10 15
30 25 20 16
T1
CN1
RA1
R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16 R17 R18 R19 R20 R21 R22 R23 R24 R25 R26 R27 R28 R29 R30 R31 R32 R33 R34 R35 R36 R37
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22
D1 D2 D3 D4 D5

3. EXPLODED VIEWS

3.1 PACKING ASSEMBLY [M1]



3.2 VPS UNIT ASSEMBLY [M2]



4
1
6
7
8
3
13
9
11
2
11
12
12
5
10
11

4. PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

RESISTORS— All resistance values are in ohms (Ω), unless otherwise indicated.

k	: 1,000 (Kilo)
M	: 1,000,000 (Mega)
Chip R	: Chip Resistor
Chip VR	: Chip Variable Resistor
Comp. R	: Composition Resistor
CR	: Carbon Film Resistor
FR	: Fusible Resistor
MFR	: Metal Film Resistor
MPR	: Metal Plate Resistor
OMR	: Oxide Metal Film Resistor
PMR	: Precistion Metal Film Resistor
UFR	: Unflammable Resistor
VR	: Variable Resistor (Potentiometer)
WR	: Wire Wound Resistor

CAPACITORS—All capacitance values are in μF, unless otherwise indicated.

pF	: μμF (Pico farad)
C Cap	: Caramic Capacitor
Chip Cap	: Chip Capacitor
Chip T Cap	: Chip Tantalum Capacitor
E Cap	: Electrolytic Capacitor
FM Cap	: Film Mica Capacitor
LL Cap	: Low Leak Current Electrolytic Capacitor
MM Cap	: Metalized Mylar Capacitor
MP Cap	: Metalized Paper Capacitor
MY Cap	: Mylar Capacitor
NP Cap	: Non-polar Capacitor
PC Cap	: Polycarbonate Capacitor
PP Cap	: Polypropylene Capacitor
PS Cap	: Polystyrol Capacitor
T Cap	: Tantalum Capacitor
TF Cap	: Thin Film Capacitor
TR Cap	: Trimmer Capacitor

NOTES:

- [M] indicates mechanical symbol number.
- [2 digits] indicates circuit board symbol number.
- "X " indicates quantities for use.

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION

* * *

PACKING ASSEMBLY [M1]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	1	PQ10405	COVER
	2	PQ20364	PACKING SHEET
	3	–	VPS UNIT ASSEMBLY, REFER TO [M2]
	4	PQ42679	SPACER

* * *

VPS UNIT ASSEMBLY [M2]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	1	PQ20362	UPPER CASE
	2	–	VPS BOARD ASSEMBLY, REFER TO [01]
	3	PQ20363	LOWER CASE
	4	–	RATING LABEL
	5	–	CORD ASSEMBLY, REFER TO [01]
	6	PU36199	RELEASE KNOB, X2
	7	PQ42627	LOCK ARM
	8	PQ42611	LOCK PLATE
	9	PQ42628	SLIDE PLATE (R)
	10	PQ42612	SLIDE PLATE (L)
	11	SSSF2608M	TAP. SCREW, X4
	12	SSSP2605M	SCREW, X4
	13	PQM30001-214	TENSION SPRING, X2

* * *

VPS BOARD ASSEMBLY [01]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU36174A-1	VPS BOARD ASSEMBLY [01]
	IC1	HD49703NT	INTEGRATED CIRCUIT
	IC2	M5278L05	INTEGRATED CIRCUIT
	Q1	2SB641R,S	TRANSISTOR
	Q2	2SC3327A	TRANSISTOR
		OR 2SC2878A	TRANSISTOR
	Q3	2SD637R,S	TRANSISTOR
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D3	1SS133	DIODE
	D4	1SS133	DIODE
	D5	1SS133	DIODE
	R1	QRD161J-103	CR
	R2	QRD161J-103	CR
	R3	QRD161J-102	CR
	R4	QRD161J-102	CR
	R5	QRD161J-102	CR
	R6	QRD161J-473	CR
	R7	QRD161J-103	CR
	R8	QRD161J-391	CR
	R9	QRD161J-562	CR
	R10	QRD161J-102	CR
	R11	QRD161J-473	CR
	R12	QRD161J-562	CR
	R13	QRD161J-105	CR
	R14	QRD161J-472	CR
	R15	QRD161J-472	CR
	R16	QRD161J-472	CR
	R17	QRD161J-472	CR
	R18	QRD161J-562	CR
	R19	QRD161J-563	CR
	R20	QRD161J-222	CR
	R21	QRD161J-222	CR
	R22	QRD161J-222	CR
	R23	QRD161J-222	CR
	R24	QRD161J-472	CR
	R25	QRD161J-682	CR
	R26	QRD161J-472	CR
	R27	QRD161J-102	CR
	R28	QRD161J-103	CR
	R29	QRD161J-103	CR
	R30	QRD161J-184	CR
	R31	QRD161J-103	CR
	R32	QRD161J-332	CR
	R33	QRD161J-561	CR
	R34	QRD161J-474	CR
	R35	QRD161J-474	CR
	R36	QRD161J-332	CR
	R37	QRD161J-103	CR
	RA1	RNBH5A224	R. NETWORK
	C1	QETC1CM-336	E CAP
	C2	QCS31HJ-681	C CAP
	C3	QETC1CM-106	E CAP
	C4	QCS31HJ-391	C CAP
	C5	QCT25CH-390	C CAP
	C6	QFN31HJ-103	M CAP
	C7	QFN31HJ-102	M CAP
	C8	QFN31HJ-102	M CAP
	C9	QETC1CM-336	E CAP
	C10	QETC1CM-336	E CAP
	C11	QCF31HP-473	C CAP
	C12	QETC1CM-336	E CAP
	C13	QETC1CM-336	E CAP
	C14	QETC1CM-336	E CAP
	C15	QCS31HJ-391	C CAP
	C16	QETC1HM-335	E CAP
	C17	QETC1HM-105	E CAP
	C18	QETC1HM-106	E CAP
	C19	QCT25CH-390	C CAP
	C20	QCT25CH-150	C CAP
	C21	QETC1CM-336	E CAP
	C22	QCT25CH-100	C CAP
	T1	PU58484	COIL
	CN1	PU58844-7	CAP HOUSING
		PU59233	CORD ASS'Y
	TP	PU56008	TEST PIN, TP1–6

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